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THE FORESTS OF THE PHILIPPINES

BY

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The frontiers of science have been extended in many ways by earnest workers in the Philippines, since America took charge of the government there. When one reflects that peace has been established only a dozen years, that the various lines of scientific work have been developed with only moderate appropriations, and that, in many lines, men have had to be trained to the special problems on the ground, it is marvelous what progress has been made.

The study of the forests in the islands, as a commercial asset, has been undertaken by the Forestry Bureau. The director of the Bureau, Major George P. Ahern, has not only made a rapid and effective survey of the commercial forest resource, but he has also had the wisdom to associate with himself young men of the highest scientific training and ability, and has thus made the study of the forest resource yield at the same time scientific studies of high value. The latest bulletin* is an example of this double purpose adequately served. Dr. Whitford has spent years cruising the forests, making careful estimates of the quantity, quality and availability of the merchantable timber. But at the same time he has gone with the point of view, and the note book of the trained botanist and ecologist, and his report is a splendid example of a scientific contribution, put in non-technical language, equally available for the

* Whitford, H. N. The Forests of the Philippines. Part I, Forest Types and Products, pp. 94. Plates 28, map. Part II, The Principal Forest Trees, pp. 113. Plates 103. *Bull.* 10 of the Philippine Bureau of Forestry, Manila, 1911. $1.25, post free.

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business man interested in the lumber industry, and for the geographer and botanist wherever he may be.

The statement here made of the forest resource of the Islands is somewhat startling, and very instructive. Dr. Whitford publishes a map of the archipelago (Fig. 1), showing that of the total area of something over 120,000 square miles, one third, or 40,000 square

FIG. 2—A caingin area in Mindoro.

miles, is in the natural untouched forest primeval, an area about the size of Kentucky; 20,000 square miles more are in second growth; 48,000 square miles are in grass land; and only 12,000 square miles are under cultivation. Of this latter figure, small as it is, a footnote calls attention to the fact that not over 6,000 square miles is under cultivation at any one time. The cultivated areas are mostly small

and widely scattered. It is a good deal of a surprise to know that the entire population of about 8,000,000 is supported by the cultivation of only about 5 per cent of the total area.

It is reasonably certain that the entire surface of the land was originally covered with forest growth of some kind. But caingin making, a primitive method of agriculture, has destroyed over half of the original cover. This method of agriculture, common in the tropics, is as follows: A patch of forest is partly cut and the felled stuff allowed to dry, and then burned.* Into this partly cleared area crops of rice, sweet potatoes, corn and the like are planted. By the time one or two crops have been taken from the patch, the cogon grass has come in. Its roots make such a network, and it grows so

FIG. 3—Cogon grassland, from which the forest has been removed by "caingin making."

fast and so rank, that it is extremely difficult, with primitive implements, to win a crop in competition with it. So the patch is abandoned, and the easier task of destroying another area of forest is begun again. The cogon grass, in the dry season, burns very easily, and the constant burning keeps down every ambitious forest seedling, though it does not injure the grass. The grass is so coarse as to be nearly worthless as forage, and, as a consequence, very large areas, nearly half the land surface, lie idle and mostly worthless. If the *cogonales* could be kept free from fire, the forest would come back, ultimately to the original form, with a forest covering determined by the factors of climate, soil and exposure.

The prevention of further destruction of the virgin forest, and

* All the illustrations for this article are from photographs by the Philippine Forestry Bureau.

the reforestation of the grassy regions on non-agricultural lands, both by the prevention of fires, and by planting, are the greatest forestry problems of the Philippine Islands.

The variations in climate, soil, and exposure determine various types of forest. Ten such types are here described, the first five of which have one family of trees, the dipterocarps, predominating.

1. The *Lauan type* is the most successful commercial forest in the Island. It is confined to regions of short or no dry season, and is best developed on gentle slopes at mountain bases, up to an altitude of 1,200 feet. It is comparatively free from jungle undergrowth and has a very complex small-tree flora, with many climbing palms. This forest has a rather closed canopy and regular profile. The forest floor, because of the shade, has a very scanty growth of herbaceous vegetation. "Stripped of its ornaments of palms, leaves, epiphytic orchids, and ferns, whose importance is exaggerated in the eyes of the people of the temperate regions, the lauan type of forest has a striking resemblance to the commercial forest of the temperate zone."

2. The *Lauan-hagachak type* occurs in regions with rainfall well distributed throughout the year, and even here is restricted to areas where the water level is near the surface of the ground. It is at its best on river bottoms. There is a larger variety of trees in this type of forest than in the lauan type.

3. The *Yacal-lauan type* is best developed where the dry season is short, and on volcanic soils. Hence the areas are not large.

4. The *Lauan-apitong type* is found in regions of longer dry season than the lauan type; hence shows a decided deciduous element in the dry season. On the lighter soils it is quite open, allowing the entrance of jungle undergrowth, especially the erect bamboo. The composition of dominant species is more complex than is the case in the lauan type, and with the rather scattered trees and the bamboo undergrowth, the forest has the appearance of a park.

5. The *Tanguile-oak type* lies above the lauan forest standing from about 1,200 feet to 2,500 feet above the sea level. Here the rain is more evenly distributed through the year, and the relative humidity is higher than is the case in the previous types. This is a meeting ground for many species from above as well as from below. This forest grades into the mossy forest above.

6. The *Molave type* occurs usually on dry limestone soil. This type covers an area of about 4,000 square miles. The trees are the

most valuable in the archipelago, and since the areas are most easily reached, this type of forest has suffered most by exploitation. The forest is open, with large trees few and far apart, and with spaces filled by jungle growth. It is decidedly deciduous in the dry season. Its composition is quite variable in different regions, depending upon differences of soil and exposure. It is very valuable because of its narra, acle, and other hard and durable timbers of high value as furniture and cabinet woods.

7. The *Mangrove type* is a forest of the sea; especially well developed in mud flats at mouths of rivers. A zone of nipa palm

FIG. 4—Typical lauan forest in Mindoro.

lies usually at the upper margin of the forest area. The canopy is well closed and even, and undergrowth is absent. It is estimated that the swamps of the islands will show an average volume of 283 cubic feet per acre of trees over eight inches in diameter. This forest is a very valuable source of firewood, charcoal and cutch.

8. The *Beach type* is found on sandy beaches above high-tide. It has been much interrupted by cultivation. In the Davao region it is rich in timber, running to 100,000 board feet per acre.

9. The *Pine type* is best developed in the high plateau of northern Luzon, from altitudes of 2,500 to 5,000 feet. The trees are scat-

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tered as single individuals in a grass area. There is ample evidence that broad leaved trees once occupying the area have been exterminated by man. The pine, less sensitive to fires, has won its way back, and is holding its own in a region that would normally be occupied by broad leaved species. There are only two or three species of pine found in the Islands.

10. The *Mossy-forest type* occupies about 3,200 square miles or about three per cent of the land surface. It consists essentially of protective forests. The topography is rough and constantly changing. The soil is scarce and land slides are common. The climate is exceedingly moist, hence there is a great development of mosses and and liverworts. Because the slopes are much exposed to the wind, the trees are of dwarf and gnarly habit.

The northern half of the archipelago, consisting of Luzon, Mindoro and the northern part of the Vizayas, has been explored, charted, and commercial estimates put on record (Fig. 1). Much of the forest area of the southern half of the archipelago is still unexplored and relatively unknown. From the careful studies already made, it is estimated that there are now standing and ready for trade under present market conditions, 200 billion board feet of merchantable timber. Since more than 98 per cent of the forest area is owned by the Insular government, this is all national forest, and as such has over one-half as much available timber as we have in all our national forests in America. In round numbers, the Philippine forests have at the present about the same number of cubic feet of timber available as the state of Minnesota now has, or about one-half what is still standing in the state of Washington. But the Philippine area produces largely woods of much higher value than that of our northern forests.

It is estimated that there are over 2,500 tree species represented in the Philippine forests. But most of these are little known, and rare, and will play no part in the lumber industry. Dr. Whitford gives a popular description of 106 trees, all that have any prominence in the lumber markets. Briefer mention is made of 272 other trees of common occurrence. The most important species are illustrated with full page plates showing the forest, or the particular tree as it stands, giving a good idea of the habit of bole and bark, and often with leaves or fruit included. Very fine full page pen drawings of twig, leaf or fruit also accompany the description of the more important species. Only one thing seems to be lacking here, and that is a three color print of the finished wood to show the

beauty of pattern and color. But this want is provided by the Bureau in another, and perhaps even better way, by the preparation and sale of hand specimens of over 400 of the principal merchantable woods.*

Most of the tree species are found in all the islands, and the variety is everywhere great. Dr. Whitford records an extreme case of eighty different tree species found on a given acre, and of these only two species which reach a merchantable size when mature. These studies have brought out the surprising fact that 70 per cent of the total forest wealth of the Islands is found in the Dipterocarp

FIG. 5—Cutting out a single piece table top from a buttress of the narra tree.

family alone, the lauans, apitongs, and yacals. Moreover, these species are usually found in almost pure stands, recalling the pine areas of our Great Lakes region. They are among the largest trees in the forests, reaching a height of 200 feet, and a diameter of seven feet or over, and the conditions invite the use of steam and the most up to date logging methods. Then, too, they are construction timbers, and take their place in the market along side of the American pine, fir and oak.

* Each sample is about four by six inches and three-eighths inch thick, with planed surfaces to show the grain. These samples are sold at ten cents each, plus four cents postage, though twenty-one of the hardest and rarest of them are held at twenty cents each.

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Next in importance to the dipterocarps, is the narra or locust family, furnishing many of the most beautiful of the cabinet woods. The dipterocarps are tolerant of shade, while the narras are light loving. As a consequence the dipterocarps occupy large areas of rich soils and well watered lands with relatively pure stands, while the narras occur isolated, in places of dry or sandy soil, or along streams. Six species of the narra family, narra, tindalo, banuyo, supa, acle, and ipil, are superb in color, grain and texture, and "for furniture and cabinet making will compare with any six other woods in the markets of the world."

FIG. 6—Interior of a mangrove swamp, on Mindoro Island.

There are no woods anywhere more beautiful than the red and yellow narra, and the trees furnish merchantable logs up to fifty feet in length, and exceptional trees to seven feet in diameter, while the wide spreading buttresses furnish single piece table tops up to seven feet or over in diameter. The white and red lauan and the calantas work as easily as pine, yet are as beautiful in the finished work as mahogany.

The business of lumbering in the Philippines is not well developed. About 70,000,000 feet of native lumber was used in the islands last year, and 20,000,000 feet imported from America, mostly

for the use of the army. Most of the licenses issued by the government are for small operators. Only three companies are using steam and American logging methods, yet there are large opportunities for development. "It is estimated that the forests properly managed can be made to yield two billion board feet annually, without being damaged. This will allow a rotation of one hundred years."

There are minor forest productions of great interest and large possibilities. There are fortunes to be made in the cutch industry, the mangrove swamps supplying the bark. These barks show from 12.5 to 39.3 per cent tannin. "It has been demonstrated beyond doubt that the soil and climate of the Philippines are favorable to the growth of the standard rubber trees." One plantation in the island of Basilan is already successfully producing rubber, and others are being started, with large promise in development. All the forests produce the rattans, though the best come from Palawan. There are large possibilities in the use of this material, for baling, matting, the furniture trade, and a great extension in plaited and woven work. The sap from the flower stalk of the nipa palms, and from the buri palm, already supply the alcohol and vinegar and fermented liquor (tuba) used in the islands, but as a source of commercial alcohol there are almost endless possibilities. The sap has as high a percentage of sugar as has the sugar beet of Prussia. Hundreds of square miles of nipa swamps lie unused and ready for continuous production.

Concessions cost nothing, and exclusive privileges may be obtained in tracts up to several hundred square miles in area. Stumpage is sold for less than half what is charged for similar forests in neighboring lands. Forest charges for the materials derived are low, averaging ten per cent of the local market price at place of production. Only the timber and minor forest products are sold, the land remains in the possession of the government.

We, as Americans may congratulate ourselves on the fact that we have achieved a good government in the Philippines, that the tremendous possibilities of wealth production in the islands are being so successfully studied, that the resources are being made available in such a way as to conserve the resources, and at the same time the rights of the Islanders. The forests as they are now may easily produce over three hundred million dollars of wealth each year indefinitely; and if, by reforestation and fire control, and other wise forestry plans which Major Ahern has adopted can be carried out, in two generations this enormous forest asset may be doubled.

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COMPLETION OF THE RAILROAD ACROSS THE FLORIDA KEYS

BY

ROLAND M. HARPER

The arrival of the first through passenger train on the Florida East Coast R.R., at Key West on Jan. 22, 1912, which was celebrated by appropriate and elaborate ceremonies, marks the completion of one of the greatest engineering feats of the century, one unparalleled in the whole history of railroad building. A great deal has been published in newspapers and magazines in recent years about this unique "sea-going railroad," but a brief sketch of its history may interest those who are not already familiar with the facts.

The Florida Keys, as is well known, are a chain of low rocky islands fringing the southern coast of Florida, extending in a gentle curve along the Gulf Stream from Key Biscayne, southeast of Miami, to Key West, a distance of about 140 miles. The distance between neighboring keys varies from a few hundred feet to several miles, and the maximum depth of the channels between them is about twenty-five feet. Key West, the only settlement of any consequence on the Keys, is located on an island of the same name about a mile wide and four miles long, and had 19,945 inhabitants by the census of 1910. It is the southernmost city in the United States (lat. 24° 33′), and for years was by far the largest one without railroad facilities. It is estimated that about half the inhabitants of the city had never seen a train before.

The construction of the East Coast R.R. southwestward from Miami, which had been its southern terminus (and the southernmost railroad station in the United States) since 1896, was begun in 1903. For the first twenty-eight miles, to Homestead, the route was through level rocky pine woods, and presented no special difficulties. From this point surveys were first made to Cape Sable, at the southwestern corner of the peninsula, perhaps not so much with a view of making that the terminus as of getting certain concessions from the people of Key West. The route over the Keys having been decided on, construction of the track beyond Homestead was begun in 1905. A mile from Homestead the railroad takes a S.S.E. course and enters the coast prairie, a flat marly region similar in general

appearance to the southern part of the Everglades, but occasionally inundated by salt water in times of storms or strong southeast winds, and dotted with millions of mangrove bushes three or four feet tall. In the coast prairie the railroad was built with the aid of two dredges, each of which excavated a ditch in the soft marl and deposited the material between them to make an embankment. After traversing the coast prairie, and the marshes south of it, in an air-line for fifteen or twenty miles, the railroad crosses a salt-water channel known as Jewfish Creek, and enters upon Key Largo, the largest of the Keys, about 100 miles from Key West. Knight's Key, forty-five miles from Key West, was reached early in 1908, and as one of the most difficult channels to cross lay just beyond, this was made a temporary terminus. Piers were built, and steamers made daily trips from there to Key West and Havana in winter (tri-weekly at other seasons).

The work of extending the railroad to Key West was pushed as actively as possible, sometimes as many as 3,000 men being employed at one time; but so many difficulties and set-backs were encountered that four years were consumed in completing the remaining forty-five miles.

The difficulties of constructing the railroad over the Keys were of several kinds. In the first place, there were about seventeen miles of channels to be bridged, most of them by a series of reinforced concrete arches, standing thirty feet above mean sea-level, so as to be out of reach of the highest storm waves. Three draw-bridges were also required. The construction of the concrete viaducts required several hundred thousand barrels of cement and several thousand tons of steel rods, all of which had to be hauled hundreds of miles, for almost the only Florida product used in the work was pine timber for cross-ties, piles, and temporary trestles. Even the laborers (all or nearly all of them white men) were largely recruited from the slums of northern cities.

There being practically no fresh water on the Keys, all the water used in boilers and for drinking, cooking, etc., was taken from the ditches alongside of the track in the coast prairie previously mentioned, and hauled down to the construction camps by train. There is a pumping station at Everglade, fifteen miles south of Homestead, and to this the water-train made a trip every night while the work was going on between Knight's Key and Key West. Mosquitoes are said to be exceedingly troublesome on the Keys at times, and must have hindered the work to an appreciable extent.

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One of the greatest drawbacks to building a railroad in such an exposed situation was the West Indian hurricanes which visit the Florida coast nearly every fall. The first one that struck the Keys while the railroad was being built there caused considerable loss of life among the workmen, but after that more precautions were taken. The engineers who had their families with them used to send the women and children back to the mainland every September, to remain until the storm period was over. The smaller channels between the keys were crossed at first by means of rock embankments, but it was soon found that the autumnal storms washed these away almost as if they were sand, and that marl dredged up from the bottom of the bay resisted the fury of the waves much better. Many of the rock embankments north of Knight's Key had to be replaced in 1910, some with marl and some with concrete arches. Although it endures storms very well, the marl is gradually undermined by the constant lapping of small waves, and one problem that still confronts the engineers is to find plants which will grow in that raw and wave-washed soil thickly enough to protect the embankments at all times.

A minor difficulty is the corrosive action of the warm salt water and spray on rails, steel girders and concrete piers. Just beyond Knight's Key is a seven-mile steel girder viaduct on which a large force of painters will have to be kept at work all the time. The water also dissolves cement slowly, and just what will have to be done to preserve the concrete piers remains to be seen.

The building of the railroad over 100 miles of keys is said to have cost about $15,000,000, or $150,000 a mile. But for the fact that this railroad (522 miles of main line between Jacksonville and Key West and about 200 miles of branches) is the property of one man, Mr. Henry M. Flagler, who was anxious to see his pet project completed during his lifetime (he is now 82 years old), and was able to pay for it out of his own pocket, Key West might have remained without railroad connections for several years longer, for the economic advantages to be derived from the building of the "sea-going railroad" are obviously not very numerous.

The establishment of a port at Knight's Key shortened the time of transit from the mainland to Cuba and points south of there by several hours, for before that, one had to embark on a steamer at least as far north as Miami. Key West has no advantage over Knight's Key in that respect, for the shorter distance between Key West and Havana will be counterbalanced by the extra length of the

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railroad journey; but it will have a slight advantage in trading with northern Mexican ports. This railroad will doubtless get its share of the increased business that is expected to come to all southern transportation lines on the completion of the Panama Canal, and the foreign commerce can of course be handled much better in a city like Key West than at a temporary terminus like Knight's Key.

But the amount of commerce that will go through Key West is problematical, for the Florida East Coast R.R. has strong competition from steamship lines for its whole length, and its freight traffic will probably have to depend largely on perishable fruits and vegetables from the tropics. The principal products of Key West itself are cigars and sponges, and those are not particularly perishable. The remaining Keys are very sparsely settled.

One incidental result of building a railroad on the Keys, which must be regretted, is that it has greatly increased the frequency of forest fires there. The higher parts of the Keys are covered with dense forests made up of a great variety of tropical trees, among them such valuable species as mahogany and lignum-vitæ, which are not found elsewhere in the United States. These forests take fire very readily in the dry season, and the destruction in such cases is almost complete over large areas. A large part of Key Largo was burned over in the spring of 1910, costing the railroad a considerable sum in damages, it is said.

Key West, which hitherto, as far as foreign commerce is concerned, has been little more than a coaling station and naval base, having suddenly risen to the rank of a first-class seaport, will doubtless now increase in population and economic importance as rapidly as the small size of the island and the limited water supply will allow.

Geographers, too, should be thankful to Mr. Flagler for greatly improving the facilities for exploring this unique corner of our country; and the genius of his constructing engineers, first, Mr. J. C. Meredith, who worked out the plans for the "sea-going railroad" but did not live to see it completed, and then Mr. W. J. Krome, who had charge of the work during the last and most difficult stages, should not be forgotten.

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FORMS OF TERRESTRIAL RELIEF
A REVIEW*

BY

R. S. TARR

The first number of this atlas is now being distributed in the form of a Fascicule-Specimen, and there is thus basis for judgment of the merit of the plan, about which geographers have already been informed by circular. Surely the Specimen gives every reason to predict a complete success for the project.

The plan, bearing the stamp of approval of the International Geographical Congress, is to issue a series of plates, illustrating eventually all important features of the forms of the land. It is estimated that about 480 such plates will be required in all, and the present plan is to issue forty-eight plates in a year. Thus the period of execution of the complete atlas will require from eight to ten years. A definite classification of forms to be included has been made out with nine major headings, and a large number of subheadings; but it is not proposed to follow this plan in the order of appearance of the plates. For example, in the specimen before us there are illustrations of seven of the nine major topics. But when the atlas is completed all these nine major topics, and each of the subdivisions, will be appropriately illustrated.

It was in 1907 that the project was first broached by Professor Emile Chaix, of Geneva, and in 1909 it was brought before the Ninth International Geographical Congress which met in Geneva. An international committee numbering twenty-eight has been named, on which the American members are Professors W. W. Atwood, W. M. Davis, and R. S. Tarr; and which includes a large number of the leading geographers of Europe. There is an executive committee consisting of Professors J. Brunhes, E. Chaix and Emm. de Martonne, upon whom, of course, the great mass of the work falls, and to whom chief credit must be given for the plan and for so much of the execution of the plan as has so far appeared. For what they

* Atlas Photographique des Formes du Relief Terrestre. Documents Morphologiques Caractéristiques, avec Notices Scientifiques. Publiés conformément à un vœu du IX^e^ Congrès International de Géographie sous les auspices d'une Commission internationale permanente, par J. Brunhes, E. Chaix, Emm. de Martonne, Éditeurs. Fréd. Boissonnas et Cie., Genève. Fascicule-Specimen.

have already done, and for what they plan to do, these three men deserve very great credit. Without hope of reward, at their own expense, they have given of their time and money to further a project that will be of value to science and to fellow workers.

What their general plan is may be inferred from the specimen now distributed. In it there are eight plates, each illustrating a particular form or combination of forms of the land. The locality and date of each picture is given, the name of the photographer, and a title; and accompanying the plate is a brief description or interpretation of the phenomena, a map showing the position of the photograph, and one or more diagrams. These descriptions are in French, German or English, according to the writer's nationality; but in the two latter cases there is added a French abstract of the description. The entire series of plates and printed pages are loose in a thick paper cover and can later be bound either in the order they appear or on the basis of the topical plan, or they may be used individually.

The work of the committee in selecting the photographs for this fascicule has been carried out with excellent judgment. Where all the photographs are of such good quality and the subject matter so interesting, it is not possible fairly to select some for special praise; but surely physiographers will be impressed by the remarkable desert pictures in Plate 7; and the striking cirques and cirque erosion illustrated in Plate 6. The other pictures are all of their kind remarkable for the clearness with which they illustrate the points intended.

No little part of the credit for the success of this Specimen is due to the publishers, Fréd. Boissonnas et Cie, Geneva, widely known for their high-class work. The photographic reproductions (Phototypie S.A.D.A.G.), which are greatly superior to our ordinary halftones, will strike geographers as remarkable for clearness of detail and generally artistic quality. The plates and the text are of such quality as to appeal to individual geographers, libraries, and geographical societies; and they will be found exceedingly valuable in college laboratories and schools where geography is taught.

That the atlas will prove a success there seems little reason to doubt; but for its success the project needs the support of geographers in two very important directions. The first of these is cooperation in the supply of photographs suitable for incorporation in the work. An appeal is made for the loan (or preferably gift) of good, clear photographs illustrating specific features of the forms of the land. There are thousands of such photographs in the hands

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of hundreds of individuals, now serving little if any purpose, which in this atlas may be made available for the use of geographers of this and succeeding generations. It is urgently requested that anyone having good photographs of any phase of earth form, which they would be willing to have used for this purpose, submit them to the Executive Committee; and if used full credit will of course be given for their use. Only in this way will it be possible to secure the best illustrations.

The second way in which aid is needed is in the form of subscriptions to the atlas. On the basis of the preliminary circular, only about 100 subscribers were secured and only five of them were from the United States. Although it is purely a work of devotion to science, with no thought or chance of personal profit, this project cannot be carried to completeness without financial support. In order to give it the widest possible chance of usefulness the price has been put at the very low sum of 30 francs for 48 plates, the proposed issue for the year,—that is at the rate of 63 centimes (a little over 12 cents) per plate with accompanying text. At this price not less than 200 subscriptions are absolutely necessary in order to meet the expenses of publication. It is sincerely to be hoped, and now that the Fascicule-Specimen can be seen, it is confidently believed by the writer, that the atlas will be generously supported, and that the United States will contribute its share of subscriptions to this noteworthy publication. The subscription blank offers the alternative of subscribing either for the first year or for the entire series.

Any correspondence relating to the furnishing of photographs for the atlas should be addressed to Prof. E. Chaix, Avenue du Mail 23, Genève, Switzerland; and subscriptions may be made through the publishers, Fréd. Boissonnas & Cie, Genève, Switzerland.

The general scope of the atlas is shown by the titles of the plates which appear in the Fascicule-Specimen:

Plate I: Le Grand-Combin, seen from Mont de a Gouille (Valais Alps). Forms due to mechanical disaggregation. Plate II: Ravin de Théus near Gap (Hautes-Alpes). Elementary forms of erosion by running water. Plate III: Cevennes. Cevenol plateau, on the watershed between the Allier and Borne. 1, Senile forms of fluvial erosion (peneplain), with commencement of rejuvenation; 2, Cevennes near Valgorge. Mediterranean slope of the central French massif. Rejuvenation of senile forms by fluvial erosion. Peneplain

carved in crests. Plate IV: 1, Sungaria. Lower valley of the Darbuti river. Fault valley. 2. The dead plain of Wildstrubal (Oberland). Example of fault worn by subsequent erosive action. Plate V: James Peak, Front Rocky Mountains. Senile forms rejuvenated by glacier action. Plate VI: The Stockhorn, Bernese Alps. An example of ancient glacial erosion. Plate VII: The Erg, seen from Taghit—contact of *erg* and *hammâda* (Algerian Sahara). Complex desert forms. Plate VIII: Cliffs of Pays de Caux and St. Jean de Luz. Elementary forms of littoral erosion.

THE INFLUENCE OF THE PRESENCE, DISCOVERY AND DISTRIBUTION OF THE PRECIOUS METALS IN AMERICA ON THE MIGRATION OF PEOPLE*

BY

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In a previous section† was traced the exploration carried on by the three leading nations in America,—Spanish, English and French. The exploring parties in some cases became so large and numerous that they really constituted a migration, a flood of immigration. It is difficult to establish a line that will properly delimit explorers and adventurers from immigrants, but for all practical purposes those who come and roam about with no intention of remaining in a place may be classed in the first group; those who come ostensibly to remain, even though not permanently in one place, may be put in the second group. A migration has the idea of mass movement and for a more or less permanent home, while the exploring party is small and never intends to abide.

SPANISH MIGRATIONS. Myers‡ speaks of the migration of adventurers and colonists from Spain to America in the Sixteenth

* This paper is a portion of the thesis presented as a part of the requirement for the Ph.D. degree in Geography at Cornell University. For other parts see this Bulletin, Vol. XLII, pp. 594–602; Scott. Geog. Mag., Vol. XXVI, pp. 449–466; Vol. XXVII, pp. 417 and 470; Bull. Phil. Geog. Soc., Vol. IX, pp. 1–22; Vol. X, pp. 36–50. Special thanks are herein expressed for criticism and suggestion given by Professors R. S. Tarr, H. Ries, and W. F. Willcox, throughout the whole work.

† *Bulletin*, Vol. XLII, pp. 594–602.

‡ Myers, P. V. W. Gen. Hist., 1889, pp. 517, 518.

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Century as to be compared only with that to California and the West in 1849 and subsequently. It was more scattered in destination, and less scattered in source. Moved by the stories of rich deposits, the desire for adventure and for a new home, thousands of Spanish and Portuguese took passage for the new continent. Because the treasure could be found in so many places, and because gold and silver had the greatest attraction, they occupied nearly all parts of South America and Mexico, and even established themselves in territory constituting at present southwestern United States. The mines in America, in these early days, drew no small part of their workers from the mines in Spain, although many of the laborers were Indians and Negroes; and, inasmuch as the precious metals were found well distributed over South America and Mexico, the colonists, scattered over all this region, have given an Iberian color to the life and activities of the whole territory.

English Immigration. South American mines were worked nearly a century, before English immigration made a beginning on the North Atlantic coast and spread westward across the lowlands to the foot-hills from New England to Georgia; and, when the English immigration began, gold and gold hunting seem to have had little power over it. Other ends than wealth were sought. The men in that stream of colonists were almost uniformly in search of permanent homes surrounded by agriculture, lumbering, fishing, and the beginnings of manufacturing. How fortunate for these colonists that they found no gold and silver in the Appalachians, for probably, had they found deposits, their settlements would have been preceded by Spanish miners' camps, and their standards of life by those somewhat opposed to the arts of peace and husbandry.

Just as gold played no part in the immigration of the early English colonists to America, so the desire for gold was not the influence that led those waves of families and civilization across the eastern barriers and to the plains and prairies of the Mississippi Valley. Likewise, the expansion into the first row of States west of that great river, a growth partly antecedent to the discovery of gold in California, apparently cannot be traced to the influence of the precious metals. Nor can those several western movements which stretched to the Pacific coast prior to 1849, really be said to have had anything to do with gold. The Mormons were forced from behind to cross the great plains. The Oregon immigrants of 1843 were induced to go by the prospect of lucrative trade in furs. A scattered emigration from the eastern and central States sifted a

sparse population of hardy pioneers through the mountains or around Cape Horn into California, Washington, and Oregon. But the motive was *not* in the gold. The results of all this fragmentary and heterogeneous westward movement of the people played its part in 1849-1853, for, when the news of the brilliant discoveries along the American River went abroad, the response first began among those who had found their way into the vicinity for other purposes than gold digging.

Local Effects in 1848. Californians were at first incredulous of the discovery, and for three months the news did not reach points outside the valley. Accordingly, the response did not begin until April, 1848. Then there began a cautious ingathering, which was quickly followed by an apprehension of the magnitude of the discoveries, a quicker dissemination of the news in ever widening circles and a hasty response to the influence of the finds. The widening circle of information could travel no faster than man could move from one place to another; hence, where geographic conditions made travel easy the circle enlarged rapidly, but on the Sierra side its expansion was greatly restricted. Consequently, the first rush of eager miners came from the California Valley and the limiting slopes of the mountains into the gulches of as many of the Sierra streams as were known to possess gold-bearing gravels. California-Americans to the number of 2,000 and California-Spanish-Mexicans and Indians, in the aggregate about 3,000, were at work by the middle of the summer. The population of the mining camps was varied, to be sure, during the first summer, but no more so than was that of California and the immediate vicinity at the discovery of gold, barring a few foreign sailors who deserted their ships in harbor. The cosmopolitan nature of the migration was a feature of subsequent years and not of the first. As soon as the news had time to get to Oregon, Northern Mexico, and the Sandwich Islands, after gaining credence near home, there started parties from these places, the Argonauts, Sonorans, and Kanakas;* and as the news of the discovery reached the far-off Peruvian and Chilian, so the response came quickly in considerable parties from each country.

So great was the excitement in the California Valley, and so contagious the gold fever, that few escaped the effects of the epidemic. The main valley in close proximity to the centers of influence was pretty well drained to the gulches before the close of the season of 1848. By June, three-fourths of the male population of San Fran-

* Bancroft, H. H. Hist of Calif., 1884, 7 vols., Vol. VI, p. 71.

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cisco had gone. *The Star,* of San Francisco, May 27, 1849, contained the following vivid description:

> **"Stores are closed, places of business vacated, houses are tenantless, various kinds of mechanical labor suspended or given up entirely,—everything wears a desolate and somber look, everywhere all is dull, monotonous, dead."**

Newspapers ceased publication by June; town council and the sanctuary services ended; sailors, and even officers, and sometimes captains, left ship in the harbor. Mexicans and Americans were equally affected; townsmen and farmers equally impetuous; judges, priests, doctors, alcaldes, criminals and their keepers, soldiers and their officers,—all classes went. Towns and farms were equally depopulated all along the valley and coast to San Diego.*

Gold and Silver Producing Regions are Mountainous. But beyond the valley on the east for a thousand miles lay mountains and deserts; and on the west, the sea. Few miners could come from adjoining territory. It was uninhabited. The gulches, themselves, and their placers were in the mountains, and the quartz veins from which these placers and essentially all others of the West were derived, lay farther up in rugged, wild, mountain masses. This topographic distribution is a result of the origin and nature of gold deposits. The metal occurs in veins and fissures, hence in regions of metamorphism, folding, and faulting; in regions where rocks may contain heated waters, often associated with intrusions or with lava flows, sometimes not yet cold.† Silver occurs in similar regions and for the same reasons. Inasmuch as rocks which have been subjected to these dynamic processes are metamorphosed and often thereby hardened, and as, with the crustal disturbances, uplift has also occurred, the country, favored with the precious metals, is usually rough, high, mountainous, and difficult of access. Reference to lists of producing States, and a comparison of these lists with a physical map of the United States, will make it clear that almost all the gold and silver produced in the country comes from two widely separated mountainous areas.

When the gold of the Southern Appalachian States was found, mining began in the midst of a well settled region, in which food-producing industries were well established, and men, although busy with other work, were right on the ground. Further, the deposits were not extensive; hence, far reaching migrations did not occur. But when the California gold was found, and, later, when both

* Bancroft, *ibid.*, pp. 59, 263. Shinn, C. H., Mining Camps, pp. 109-114.
† Am. Inst. Min. Eng. (1903), Vol. XXXIII, pp. 790f.

metals were discovered in other Western States, the newness, roughness, inaccessibility, and distance to centers of population had successfully restrained any considerable accumulation of people and any development of other industries. Consequently, the rich and extensive deposits, by virtue of their geographic position and associations, did not find at hand labor and supplies for their exploitation; and, when the news of their discovery went forth, it called out a great migration; a migration from distant regions where labor was more abundant.

Excitement in Eastern United States. Word of the unusual stir on the Pacific did not reach the Atlantic coast until late in 1848, because of the great distance and difficult transportation; and, during the winter and early spring of 1849, the news was spread far afield, until by the close of summer of that year knowledge of the mining possibilities there had become world-wide. No such widespread excitement had ever been known before; and nothing so far-reaching and influential has occurred since, although just as great discoveries of wealth have been made. The sweeping force of the craze arose from the remoteness of its source, and the consequent novelty and wildness, and from the richness of the deposits compared with anything known before. It was beyond the dreams of the ancients.

As the fact took hold of the people in eastern United States, thousands determined to go. Whitney conjectures that within a few months, some 50,000 of the healthiest and most energetic young men of the nation were on their way to California. So strong was the desire to go, that many started by one of the sea routes before the winter was over; and as the weather permitted, others departed by the land routes, until almost every town throughout the Eastern States had contributed a representative to the great army now closing in on California. Whitney estimates that 100,000 reached the region during the year 1849, among whom were citizens of every State in the Union. The estimate was probably a little generous.* Land routes were popular and supplied as many miners as the sea routes, but not so continuous a stream; because most were pro-

*Whitney, J. D., Encyclopedia Britannica, 9th Ed., Vol. 4, p. 701. Shinn, C. H., Mining Camps, p. 109. R. H. Patterson (The New Golden Age, Vol. 1, pp. 108–9) estimates the white population of California, in 1850, at less than 100,000, and quotes the census of Nov., 1852, at 170,000 whites. Shinn (Mining Camps, p. 132) says: "In December, 1849, there were 53,000 Americans in California," and a few pages later, states that in 1849 35,000 persons came to California by sea, and 42,000 by land. Not many had left for other fields as early as the close of 1849. Perhaps as much credence should be given to Whitney as to Shinn, who presents considerable discrepancy in his own statements.

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hibitively closed during the winter, while one might sail anytime during the twelve months.

Land Routes. Overland routes had been known for years prior to 1848.* The fur traders had worked them out, and the explorers had mapped some of them; but it should be remembered, that they were not made for continuous traffic across the continent. The connecting passes and high level routes had not become well established because so little used. Even the well ordered trails, formerly used primarily for freight, now became great passenger routes.

A common starting point was at the elbow of the Missouri River, but several towns in the vicinity became outfitting towns: St. Joseph, Westport, Leavenworth, Ft. Kearney, Independence, Kansas City, and even Omaha became important commercial centers in the effort to meet the needs of the trade. The northern routes to Laramie and South Pass conducted rather more emigrants westward that the southern route to Sante Fé, probably because the gold was mainly in the northern half of California, and because the emigrants did not know, or at least realize, that a longer journey, but at a much less altitude, by Sante Fé might bring them to their desired grounds equally as soon. Possibly the aridity and lack of settlements tended to keep people from the southern route, while the recruiting station at Salt Lake City offered a chance to rest by the northern line. The routes followed by the land emigrants through Salt Lake City led through rugged mountain passes and over long desert stretches; and then, as the pioneers approached the eastern flank of the Sierras in the rush to be first into the coveted gravels, they began to scatter and thus were compelled to use poorer, less traveled trails both up the slopes and through the passes of the crest. Having passed the summit, they scattered down the gulches from the Pitt in the north to the Tuolumne in the south. This brought them first to the upper ends of the steep, deep, defiles whose floors farther down were auriferous gravels.

These northern routes were beset by Indians. As long as the migration consisted of the fur-traders and an occasional settler, the natives cared little; but when the glamor and attractiveness of gold brought thousands of prairie schooners sailing across their grounds

* Chittenden, H. M. Early Steamboat Navigation on the Missouri River, 1903.
Chittenden, H. M. Hist. of Amer., Fur Trade of The Far West, 1902.
Fremont, J. C. Report of The Expl. Exp. to Rocky Mts. in 1842, &c., 1845.
Lewis and Clark. Explorations in The North West.
Parkman, Francis. The Oregon Trail.
Semple, E. C. Amer. Hist. and Its Geographic Conditions, 1903.

in one summer, and when towns and roads and all that drives out wilderness crowded in and claimed their habitat, they became restless, then revengeful. It only needed the lack of watchfulness on the part of the government, whose attention was elsewhere at the time, to permit the outbreak of trouble and hostilities beween the Indians and the settlers in 1862.

Those who came by the southern route past Sante Fé, along the Gila River or the Spanish Trail, and across the Colorado River at Yuma into Southern California had to endure more desert, found a warmer climate, less rainfall, less forest, and had no great altitudes to traverse. They came into the California Valley and swung northwestward through the tule-covered swampland, or along the western foot of the mountains, and entered the gulches at their lower or western ends. They were led through territory already appropriated by Mexicans; and after the first summer, had not only the wicked Apache Indians to watch, but also the outlaw or the expelled Mexican miner who frequented these roads and robbed the traveler. Returning miners who presumably had in possession at least samples of California's treasures, proved most fascinating bait. Robbing became quite a business under the superior temptation presented by the returning miners, or by those going to new fields with their accumulated wealth in their belts. And not only was robbery committed, but occasionally entire parties were put out of the way by outlaws lurking in the defiles through which the caravan must proceed. In California, express companies abandoned their routes, because their goods so endangered the lives of their drivers. Robbing and murder were not local features but occurred on most of the trails and even on the highways between the mines and their trading centers.

The water routes worked out under the lead of gold were varied; but those broken at the Isthmus gave at least a possibility of a shorter time period than either the overland or Cape Horn route, hence they were always overcrowded. Until 1855, when the Panama railroad began duty, more emigrants, bound for California, arrived at the Atlantic ports than Isthmian transportation could be found for; and many more succeeded in crossing and reached the western ports than could find passage on the Pacific vessels to California, partly because so many Pacific ships were tied up at San Francisco. Consequently hundreds, probably thousands, were delayed between the two oceans, and became the prey of malarious diseases, which they were often unable to shake off, and therefore were never able

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to grasp the gold they were seeking. A goodly number sailed around Cape Horn; and in these long journeys, subsisting on improper food, ran the risk of scurvy to which many fell victims. By December, 1848, the stream of emigration had become a rush. Ships were loaded at almost every Atlantic port. Vessels were drawn from the whaling business and from all kinds of trade greatly to the disarrangement of other commercial lines.*

Gold Created Great Migration. When one compares the small trickling stream of migration to the Far West prior to 1848 with the mighty river which surged through the passes and deluged the deserts between 1849 and 1856, he arrives at an expression for the magnitude of the influence emanating from the California gravels. Nor should the numerical response alone be taken as the measure of the influence. The obstacles to overcome, because the gold occurred in a far away mountain wilderness, were gigantic; over 3,000 miles by land for the far easterner; 2,000 miles for the prairie farmer; deserts, sand and dust, mountains and forest, snows and exposure, three or four months of severe hardship and privation; or, if by water, exposed for as long a time to dangers by sea; the sacrifice of home and its associations and comforts; the denial of friends, business and pleasures; and finally the expense of all this journey with only a hope at the end. Truly, tremendous, must have been that power over the lives of men to induce such enthusiasm and excitement, and to make men willing to submit themselves and often their families to such hardships. Chittenden† justly styles the movement as one of the most wonderful migrations of people on record.

Those going by sea were almost entirely from the coast regions, while those of the interior waited for spring to open up the land route. The response was strongest throughout the great Missisippi Valley, perhaps, because many of these people had moved once within the generation and were thus more susceptible to the moving fever than those farther east; perhaps, because they were nearer the gold fields.

Yet not only did the people of the eastern United States catch

* H. H. Bancroft (Hist. of Calif., Vol. VI, pp. 121-5) gives the following figures attesting the volume of emigration from Eastern United States by sea: From six Atlantic ports between the dates of December 14, 1848, and January 18, 1849, 61 vessels carrying an average of 50 persons set sail. In the month of February, 1849, 60 vessels weighed anchor in New York Harbor loaded with California passengers, and 70 more in the harbors of Boston and Philadelphia. During the winter of 1849-50, 250 vessels sailed from Atlantic ports for California, 45 of which arrived in San Francisco Bay on the same day.

† Chittenden, H. M. Early Steamboat Navigation on The Missouri River, 1903, Vol, I, pp. 173, 4.

the gold fever and respond to the call; but, in the latter part of 1848 and during 1849, some 2,000 immigrants reached California from Oregon and Washington; and by July, 1849, 15,000 foreigners from Mexico, Chili, Peru, and other Pacific States had arrived. New Holland, Australia, the Marquesas Islands, and even China each sent its quota. Just a year from the discovery of gold, a flood of European emigrants, mostly British, arrived to try their fortunes.* In fact, nearly every civilized land was represented in the diggings of California during the course of the first five years. The Southern Appalachians happily sent to the West many men who knew the processes of placer mining, and found in California a larger freedom in which local mining institutions were rapidly developing.† European mining regions sent squads of miners trained in conservative methods of mining and disciplined in knowledge of camp life and organization, who contributed both to the common fund in their adopted country. Many miners from the south brought along a few negroes, thus adding another element to the ample heterogeneity of the mass collected around the mining centers of California.

Japan's stolidity under the almost universal excitement is somewhat remarkable; but it is asserted by Bancroft‡ that she was almost absolutely indifferent to all the world's bustle and flurry; and the almost total absence of the Japanese from California until many years after bears silent testimony to his indifference. With China, the case was very different. Either in direct response to the influence of gold in the rocks, or else with a desire to engage in some other business than mining, but tributary to it, her people came; 3 in 1848, 700 in 1849, over 3,000 in 1850, as many more in 1851, and about 10,000 in 1852, so that by the opening of 1853 at least 20,000 Chinese were in the State. Then the incoming rapidly declined.§ A great many arrived from the Hawaiian Islands and easily became the menial class. They were accustomed to it, and were willing, when there arose a need for such work, to be laborers of the lowest class. Moreover, the fact that gold had been acquired with simple, cheap equipment, and that no one had been able to hire laborers in the placers for what such laborers easily ran the chance of making when working for themselves, had given rise to a uni-

* Patterson, R. H. The New Golden Age, 1882, Vol. I, pp. 104, 5.

† Shinn, C. H. Mining Camps, 1885, p. 40.

‡ Bancroft, H. H. Hist. of Calif., Vol. VI, p. 124.

§ *Ibid.*, Vol. VII, p.335 f; Semple, E. C., American History and its Geographical Conditions, 1903, p. 319.

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versal aristocracy with no true laboring class. When, owing to changed mining conditions, such a class became necessary, the ports of China were nearer in time, expense, and hardship than were the Eastern States, hence the Chinaman stepped in and became the common drudge.*

Prior to the discovery of gold in California, the Spanish-Mexicans were coming into the valley in greater numbers than the Americans. The query might well arise, would this condition have continued, had not the new mining industry invited the thousands to immigrate? And had it continued, would not the Americans, when the time came for their expansion, have found little desirable land unoccupied? The discoveries seem from this point of view to have been very timely.

Increase of Population. No statement of the increase of population in California will portray the phenomenal growth better than can be done with a few figures. Each year before 1848, a few had come until, by the summer of 1845, just prior to any emigration which could possibly be ascribed to the influence of gold, the State contained 2,000 Americans and as many Mexicans. In December of the same year there were 6,000; in July 1849, 15,000 and in December, 53,000. In June 1850, the total white population was 92,597 and in November, 1852, according to the census taken that month, it amounted to 269,000, of which about 30,000 were Indians, 20,000 Chinese and 2,000 negroes.† The center of population in the United States migrated 81 miles westward during the decade 1850-1860, the movement being about 50 per cent. larger than that of preceding decades, and a result of the emigrating impulse that was filling up the far western territory.

This same phenomenal growth of population has been witnessed in most of the newly discovered gold regions. In Alaska, the Nome coast furnishes an illustration where the conditions were even harder to meet than those of California. On January 1, 1899, a few Eskimo huts and one or two sod houses for white men were the only human habitations along 60 miles of coast. In June, a dozen or score of tents housed the entire population, and in October, 5,000 whites were dwelling on the beach.‡ Another illustration comes from Australia. Gold was discovered in Victoria in 1851. Previous immigration had been rapid, but at this time it took a sudden

* Semple, E. C., *loc. cit.*, p. 320.

† Patterson, R. H. The New Golden Age, &c., Vol. I, pp. 108–9. Shinn, C. H. Mining Camps, p. 132. Abstract 12th Census of the United States, pp. 32–33.

‡ U. S. G. S. Prelim. Rept. on Cape Nome Region, Alaska, Brooks & Schrader, p. 45.

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leap. In 1846, Victoria contained 33,000 people; in 1851, 51,000; and in 1854, 236,000.*

Other Effects on Population. This rapid growth in the number of people was not the only effect of the precious metals on the population of the West. Society was masculine, and most of the men were under forty years of age. Only men of youth and vigor could make the journey or bear the privations and exposure of camp life. Wisely, the selection in the main occurred in the homes, and only the young, healthy men started. The novelty and wildness, the adventure and risk of the journey and of mining, appealed to the young men more than to those who were rooted in business or family. Shinn† says there were but 15 women in San Francisco in the Spring of 1849. There were many camps with none at all, and others containing but one family among, say 40 single men. Perhaps the inequality of the sexes numerically was greater among the Chinese than among any other nationality. In August, 1852, not one in a thousand among them was a woman.‡ Bancroft, after discussing the manliness and strength of character of the men who came under the influence of gold mining camp life, remarks that "the comparative superiority of the men over women is an expression of the law that the power of attraction due to gold and silver does not tear away from civilized and cultured comforts the same select grades of both. Nor do the mining habits develop the same admirable qualities in women as in men.§ Even in the report of the 12th Census 1900, there is shown a remarkable difference in the number of men and of women in the mining States of the West, a condition not entirely due to the mining industry, but partly to the fact that these States constituted a part of our frontier. Table I summarizes the population conditions in the mining States and Territories and in some others. In Arizona, Idaho, Montana, Nevada, Wyoming and Alaska mining constituted a larger per cent. of the total industries of the region than in the others, and here the largest percentages of male population were found. In Utah, although mining constituted a considerable portion of the business, religious influences kept the percentage of males lower than in any other State west of the Mississippi, except Louisiana. Nevada presents an interesting example. In 1880, her population was 62,266; and it has been declining ever since, while the percentage of females has been increasing. The declining industry through these

* Nicholson, J. S. Effects of Great Discoveries of Precious Metals, 1887, pp. 38–9. †*Ibid.*, p. 137.
‡ Bancroft, H. H. Hist. of Calif., Vol. VII, pp. 335f. § *Ibid.*, p. 715.

twenty years is that of mining. It seems probable that the miners who are going to other places are single men, while the family men in other occupations are remaining. If this be true, it emphasizes again the law that the precious metals attract for workmen, single men. Should it be charged that these western mining States possess a high percentage of male population, simply because they are on the frontier, the answer comes from all the States not engaged in this kind of mining whose settlement has taken place mainly since California began to be filled up, and which may, for this reason, be considered pioneer States. Table I, part B, summarizes the conditions in five of this class. The disparity of the sexes is less than half as great in these five as in the eleven western states and territories excluding Alaska. Inasmuch as Oklahoma is by far the most newly settled of all, one would expect to find it approaching California; but while it has the greatest inequality of any of the five, it is as far from California as from Kansas, the state of the second group having the minimum inequality.

TABLE I. POPULATION OF GOLD AND SILVER MINING STATES CLASSIFIED BY SEX.

STATE OR TERRITORY.	POPULATION 1900.			PERCENTAGE.	
	MALE.	FEMALE.	TOTAL.	MALE.	FEMALE.
Part A					
Western Division....	2,297,732	1,793,617	4,091,349	56.2	43.8
Arizona.....	71,795	51,136	122,931	58.4	41.6
California...	820,531	664,522	1,485,053	55.3	44.7
Colorado	295,332	244,368	539,700	54.7	45.3
Idaho.....	93,367	68,405	161,772	57.7	42.3
Montana	149,842	93,487	243,329	61.6	38.4
Nevada	25,603	16,732	42,335	60.5	39.5
New Mexico.....	104,228	91,082	195,310	53.4	46.6
North Dakota.....	177,493	141,653	319,146	55.6	44.4
Oregon	232,985	180,551	413,536	56.3	43.7
South Dakota.....	216,164	185,406	401,570	53.8	46.2
Utah.....	141,687	135,062	276,794	51.2	48.8
Washington.....	304,178	213,925	518,103	58.7	41.3
Wyoming	58,184	34,347	92,531	62.9	37.1
Alaska.....	45,872	17,720	63,592	72.1	27.9
Part B					
Indian Territory.....	208,952	183,108	392,060	53.3	46.7
Kansas.....	768,716	701,779	1,470,495	52.3	47.7
Minnesota.....	932,490	818,904	1,751,394	53.2	46.8
Nebraska	564,592	501,708	1,066,300	52.9	47.1
Oklahoma.....	214,359	183,972	398,331	53.8	46.2

The population in California did not increase as fast as immigration might seem to warrant, because of emigration from the State to new gold and silver deposits, and because a reaction in mining matters set in after about five years of rush and excitement. The mania had run its course and was abating. It was influenced slightly, too, by a counter attraction in the Appalachian mountains.

There began about this time a general search for gold throughout the eastern mountains. Many men engaged in it; and under the stimulus of Western excitement, mining, as well as prospecting, revived in the East, although the output was rather decreased at first by the movement westward and did not recover for ten years. Another reason why California's population grew slowly after 1853, is found in the compulsory exodus of a large number of Mexicans and half breeds to Mexico; an expulsion deemed necessary, because the lawlessness of the Mexican had been much aggravated by the conditions in which the mining had placed him; and made possible, because there had responded to the call to come West so many more men from the States than from the south. The foreign population from the south, however, was only expelled when its character made it an undesirable element.*

Prospectors and Rushes. The development of mining evolved the prospectors, whose whole purpose seems to have been to roam about and unearth new deposits of treasure. They scattered from the camps up the sides of the gulches, across divides laterally and down into parallel valleys, or out at the upper ends of valleys and down the eastern Sierra slope. Thus other gulches and their contents became known. Men worked their claims, and told or wrote to their friends what they had found, or so described it that similar deposits were identified elsewhere. Other men came to visit the mines and camps, and after a little examination declared that they had the same kind of stuff at home, and forthwith proceeded to prove it. By these exploratory wanderings the extent of the gold fields of California became known.

The prospector wandered out of the State and into others, made magnificent finds, or told of finding magnificent things; and immediately there were swarms of men, urged by strong desire, who were ready to leave sure things for the possibility of something richer. By this means there arose many local or even inter-state migrations of considerable bodies of men. Whole camps became fired with something akin to the feeling in the bosom of the roving prospector, but differing in that they knew where they were going, while the prospector never knew. Hundreds of rushes of men from one gulch to another occurred, thus scattering the miners in all directions. Camps often sprung up, mushroom like, in a night, and flourished a few months or even a year or two, and then were left deserted and abandoned, because the builders had taken a new attack

* Whitney, J. D. Metallic Wealth of the U. S., p. 137.

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of the gold fever. While such frequent moves were usually disastrous to many of the participants, they were factors of progress; and their final result was an ever widening benefit to the state and society, because they increased knowledge both of land and mineral; they mixed men in their period of rapid transformation and prevented local sectionalism; they diffused knowledge of methods of mining and reducing the ores; they acquainted men with several conditions under which the ore occurred; and in many ways made for the improvement of the industry and the more uniform development of the whole western region.

Examples of significant or extensive migrations by means of rushes are easily found and date from the beginning of the history of western gold mining. No sooner had the development of California's wealth gotten well under way than such emigration began. Sometimes, the particular provocation was a report of a promising bonanza, based on some prospector's discovered "traces of gold;" sometimes, it was a day's or week's hard luck in the home beds that sufficed to send forth the restless miner. In the Fraser River rush of 1858, 15,000 hardy men left California in four months, and other thousands later.* In the following year, thousands went to the Cariboo B. C.; and in 1860-1862, a multitude hastened to Idaho on the Clearwater and Salmon rivers. The Washoe rush occurred at the same time. During 1860-1862, Nevada sagebrush deserts and treeless mountains proved attractive, and California miners began to gather treasures from Humboldt, Esmeralda, etc. In 1862, a rush to Boise, Idaho, occurred;† in 1863, to Owyhee; in 1864, to Alturas; to Big Bend of the Columbia in 1865, and to White Pine in 1866. California lost to these regions in the last three or four of these years 30,000 to 40,000 men. Nor did all in each new place come from the one State; for the later rushes were made up in part of men who had become accustomed to rush, and in part of men fresh from the East, as well as of those who were leaving California for the first time. Rushing into new territory was not confined to the early days but continued down to the present century. Nor was it a feature of American mining; for Australia, in the fifties, had many wild, exciting rushes and occasional examples all along, until the famous West Australia excitements in the nineties, of which the Siberia rush was perhaps the most notable.‡ Klondike in the later nineties, and Nome in 1899 and 1900 with Thunder

* Bancroft, H. H. Hist. of Calif., Vol. VII, pp. 682-3.
† Bancroft, H. H. Hist. of Wash., Idaho and Montana, pp. 406f; 418.
‡ Amer. Inst. Min. Eng., 1898, p. 496.

Mountain, Idaho, in 1901-2 bring the rush down nearly to the present. The surficial nature of the gold occurrence in placers seems directly responsible for this peculiar character of migrations. Quartz deposits do not elicit the phenomenon, because it takes capital and machinery to get anything out of them, and the single handed miner with rapid development ideas can do nothing. In this shifting about, many became discouraged with mining and turned to other occupations, as they found suitable localities for grazing or cultivating. Almost all occupations were recruited from among the miners, as they had contributed to that class.

Rushing not only gave an impetus to all the Western States, but by this form of migration miners overflowed into British Columbia and even into Northern Mexico, teaching the Mexicans better methods of working. They affiliated with them, fought Indians for them, and prepared the way for closer international relations.* The wandering miners even spread into South America, Alaska, Australia, and the Transvaal, from all of which our own Western States have now received miners; and carried with them their laws and customs as well as methods of working. Often the transported Yankee mining notions were unworkable in the new conditions; but the ingenuity, which responded to the former conditions, was again sufficient to devise something that would work, and so the diffusion of ideas went on working beneficence all the way as surely as did those Crusades of the olden days.

Reflex Wave of Migration. The fact that the first great discoveries of gold and silver in the United States were very near the western coast, and that subsequent disclosures were made at varying distances inland, led to the reflexing of the wave of migration and development. All focussed on California for a few years; then other discoveries were made, in Oregon in 1852, Washington in 1855,† with Arizona in 1858, Nevada in 1859, and Idaho in 1860 or 1862,‡ completing the semi-circle around the first State. Colorado, a little out of time, was found to be rich in gold in 1859 by men enroute to California; and there followed a rapid immigration from the West as well as from the East. Other valuable deposits were revealed in Idaho in 1861 and 1863. Montana started the second semi-circle in 1860 and 1862, and possibly in 1858, which New Mexico in 1860, and Utah in 1867 completed. Then came the outposts of South Dakota in 1876 and Alaska in 1880. The dates of

* Shinn, C. H. Mining Camps, pp. 291–2.
† Bancroft, H. H. Hist. of Wash., Idaho and Mont., p. 108.
‡ *Ibid.*, p. 406. Eggleston, Edw. United States and Its People, 1888, pp. 75–77.

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admission to statehood confirm this truth and illustrate still further the influence of the mining industry. California, the first western State to receive the honor, entered the Union in 1850. Oregon and Nevada, two adjoining States, followed in 1859 and 1864, respectively. Although Utah's population was sufficient before 1870 to admit her with her semi-circle, for other reasons she was detained until 1896. In 1889 and 1890, the second semi-circle, begun abnormally by Colorado in 1876 (already an important mining State), was completed by the admission of Wyoming, Montana, Idaho and Washington. South Dakota was admitted in 1889, also, but not primarily on account of the mining population. Arizona, due in the sixties, and New Mexico due with Idaho and Wyoming, did not gain statehood until a very recent date. Their interests, although mostly mining, were relatively slight; and their populations consisted, beside the miners, mostly of Mexicans and Indians. As the widening waves of discovery spread from California as a center, so the wave of migration set in the same direction; and in the course of thirty years, with constant additions from the East, had beaten back across all the mountains, setting in motion the machinery of development in every State.*

* Chittenden, H. M. Early Steamboat Navigation on The Missouri River, 1903, Vol. II, pp. 265f.

THE GEOLOGY OF THE LAKE SUPERIOR REGION. A REVIEW*

The Lake Superior Region, noted as a producer both of iron and copper, has been more thoroughly studied than any other area of equal size in the United States. Among those who have worked on some part of the region are a large proportion of the leading geologists of America and also some from Europe.

Since early in the Nineteenth Century, geological surveys, under national, state or private supervision, have usually been in progress. The literature on this region is accordingly so enormous that it is difficult for a student to become familiar with all of it. It is therefore of prime importance to have an analysis of the phenomena and problems of the region as far as it is now understood. This monograph is the first attempt to discuss the region as a whole and, natu-

* The Geology of the Lake Superior Region. By Charles Richard Van Hise and Charles Kenneth Leith. 641 pp., 49 pls., 76 figs. *Monographs* of the U. S. Geol. Surv., Vol. 52, 1911. Washington. 11¼ x 9½.

rally enough, it appears under the auspices of the United States Geological Survey, and has been prepared by the two authors who have been most continuously connected with Lake Superior geological study.

The Lake Superior region, as represented on the accompanying geological map, includes 180,000 square miles. It occupies a part of the southern margin of the great pre-Cambrian shield of northern North America, bordered and overlapped on the south and southwest by later sedimentary rocks. Although the area included in the monograph is so extensive, the portion of most interest is far smaller, for the iron and copper deposits are found only in these pre-Cambrian rocks, and occupy an area of less than 3 per cent of the Lake Superior region. As the authors point out: "The great development of the mineral industry in this region has afforded the geologists unusual opportunity for study... This fortunate combination of a field containing an exceptionally full record of a little-known part of the geologic column with the means of studying it has warranted the study of the pre-Cambrian with a degree of detail that has been practicable in but few other significant pre-Cambrian regions."

A chapter on the history of the region contains an outline of the development of each district, and tables of output. We learn from these that, up to the end of 1909, there had been shipped 449,656,472 gross tons of iron ore, nearly half of which came from the Mesabi range. The third chapter contains a brief history of the geological work and includes a full bibliography.

The authors have been assisted by several associates, particularly Lawrence Martin and W. J. Mead. Professor Martin contributes Chapters 4 and 16 on the Physical Geography and the Pleistocene respectively. The chapter on Physical Geography, illustrated by sketch maps and an excellent relief model, not only summarizes the results previously published, but, in some respects, contributes a new point of view concerning a region of unusual interest. In this chapter the region is divided into three provinces: (1) the Lake Superior Highlands; (2) the semi-circle of lowland plain; (3) the Lake Superior district; and each of these provinces is separately described.

The highlands form a remarkably even peneplain with a general elevation of from 1,000 to 1,700 feet, though with monadnocks which rise to a height of a little over 2,300 feet. This peneplain is described and its erosive features, such as ridges, mesas, monadnocks and valleys, are discussed and interpreted. Perhaps in late Algonkin or early Cambrian time, the peneplain was, in part at least, buried beneath sedimentary deposits and later resurrected. It was, moreover, subjected to warping.

Encircling this highland region on the south, east and west, are horizontal, or nearly horizontal, early Paleozoic strata; and towards the west, Cretaceous strata, the whole forming a belted plain, whose topography is more or less obscured by glacial deposit.

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Sunk partly in the lowland belt, but chiefly in the pre-Cambrian highland area, is the basin of Lake Superior, which everywhere, except on the southeast side, is bordered by an escarpment that rises sometimes directly out of the water, sometimes at a distance back from the shore. It rises from 400 to 800 feet above the lake surface, and sinks from 500 to 900 feet below the water.

In considering the origin of this basin, Professor Martin points out that Lake Superior is unlike the other Great Lakes, in that it lies not along the contact between pre-Cambrian and Paleozoic rocks, but in the pre-Cambrian everywhere excepting in the southeast. While admitting the synclinal structure of the Lake Superior basin, he questions the old explanation that the basin is due to this down-folding, for, as he points out, such an old structural basin could neither have remained unfilled for so long a time, nor could it have retained the present abrupt boundaries which bear all the characteristics of topographic youth. He adduces evidence which seems to show that the bounding escarpments are due to faulting, and concludes that the Lake Superior Basin is a *graben,* due either to recent faulting or, more probably, to ancient faults whose escarpments have been buried beneath sedimentary strata and resurrected by later denudation. He holds that glaciation has modified the topographic features only in minor detail.

Chapters 5 to 15 include a painstaking outline of the main features previously worked out in the various ore fields. While these chapters are of much importance they are of particular interest to the local student, the structural and economic geologist, and the miner rather than to the geographer.

Chapter 16, by Professor Martin, discusses the Pleistocene phenomena, describing features of deposit and giving an interpretation of the glacial history. The glacial invasion stripped off the soil in the region north of Lake Superior while south of the lake a heavy mantle of glacial deposit was left. The "influence of glaciation on topography was minor" in importance, but "the effects on soil, drainage, forests, and the subsequent pursuits of man were most profound." The nature of these influences and the various kinds of deposits are discussed and the chapter includes an outline of the history of the expanded marginal lakes associated with the ice recession.

In Chapter 17, which deals with the iron ores, there is a discussion by the authors and W. J. Mead, of the characteristics of the ores and the methods of exploration employed in locating them. These methods include drilling. Not less than 26,500 drill holes have been put down, making a total of 1,363 miles of drilling, at a cost of $21,600,000. Dr. Leith has gained high skill in the study of drill cores, and their interpretation and his remarks upon the significance of drill records are of special importance.

Up to 1910, 335 mines have been worked, and it is estimated that 20.5 per cent. of the known reserves have already been consumed. About 1,905,000,000 tons of ore are estimated to be at present available, 1,600,000,000 tons of it in the

Mesabi range. If this estimate is correct, and if the rate of mining in 1910 should be maintained, the available ores would be exhausted in forty-five years, or in 1956. This estimate is not to be taken too rigidly, for there are variable factors. There is the probability of new ore discoveries, of the use of larger proportions of low grade ores, and of decrease in output, due to a greater use of deposits in other regions. These tendencies toward reduction in rate of exhaustion are opposed to the other tendency toward increase in shipment, through increased industrial demands. No accurate prophecy can be made concerning the future of the Lake Superior iron production. It is to be noted that "prior to 1911 the discoveries have kept well ahead of the shipments"; but it is hardly probable that this will be maintained for very long in the future. In view of the fact that the Lake Superior region produces about 80 per cent. of our iron ore and contains approximately 60 per cent. of the reserves now known to be available, the question of the future of the Lake Superior region is naturally one of the greatest importance." The authors conclude that "while the ores at present available would probably be exhausted within about fifty years if they alone were drawn from, the increasing use of lower-grade ores, already begun, will lengthen this period many times."

In 1907 the average cost of carrying the ore from the upper to the lower lake ports, was 72.16 cents per ton, and the average cost of transportation to the furnaces, $2.14 per ton.

Messrs. Van Hise and Leith hold that the ores are altered parts of chemically deposited sedimentary formations, a few representing originally rich layers that were subjected to only minor secondary change, but most of them underwent extensive secondary concentration, which was, in fact, "the essential means of enriching iron-formation layers to iron ores." The original source of the iron was mainly basic igneous rocks, the iron being removed and later concentrated by meteoric waters, whose activities have been localized by a considerable variety of structural and topographic features, the development of the ore representing a partial metamorphic cycle. The discussion terminates with a genetic classification of the iron ores of the world.

The closing chapters deal respectively with copper in Chapter 18, silver and gold ore in Chapter 19, and general geology in Chapter 20. This monograph will long stand as an adequate discussion of the complex phenomena of a unique region.

RALPH S. TARR.

GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

ANNUAL MEETING OF THE SOCIETY. The annual meeting of the Society was held at the Engineering Societies' Building, No. 29 West 39th Street, on Tuesday, January 23, 1912, at 8.30 P. M.

Vice-President Greenough in the Chair.

REPORT OF THE COUNCIL

The Annual Report of the Council was presented and read by its Recording Secretary, Mr. Levi Holbrook:

January 18, 1912.

To the American Geographical Society:

The Council respectfully submits the following report for the year 1911:

The number of Fellows on January 1st was 1,210. The additions have been 63; the losses by death, resignation, etc., 100; and the total Fellowship on December 31st was 1,173, of which number 371 were Life Fellows.

There have been added to the Library 743 books, 2,935 periodicals and pamphlets, 350 maps and charts, and 23 atlases.

There were published in the *Bulletin* besides the Geographical Record, the Book Reviews, Map Notices, and Bibliographical Lists, fifty-two papers, all but four of which were original contributions. The Index to the volume for 1911, over 100 pages in length, is a comprehensive record of the geographical literature and cartographic products added to the library and map room during the year.

Six meetings of the Society were held, at which addresses were made by William Edgar Geil, Mrs. Charles Schaeffer, Arthur Stanley Riggs, John Green Brady, Charles E. Fay and Walter McClintock.

The Cullum Geographical medal has been awarded to Jean B. E. A. Charcot for explorations and surveys in West Antarctica which have added much to geographical knowledge.

The Society's collection of maps and appliances used by teachers of geography in European schools has been exhibited during the year at various points in Missouri, New York, Massachusetts and Michigan. The exhibitions continue to be successful in their educational influence, and the collection will be kept in circulation so long as there is demand for it.

Soon after the opening of the year, Mr. Archer M. Huntington felt it necessary, for personal reasons, to resign the active presidency of the Society, his interest in it remaining, happily, undiminished. The Council in November elected him Honorary President, such action being permitted by the By-Laws in the case of persons who have rendered distinguished and valuable service to the Society.

Early in the summer, the office, library and possessions of the Society were transferred to its new fire-proof building on Broadway at 156th Street. This building, the land on which it stands, and all expenses incident to the change from 81st Street, come to the Society as a free and clear gift from present and

former members of the Council, none of the general funds being drawn upon, even for furnishings, etc.

The property No. 15 West 81st Street has been sold at the very satisfactory price of $175,000 and its proceeds invested at interest; the whole income becoming available for the general purposes of the Society.

The Society plans to commemorate the sixtieth anniversary of its foundation and the first of its installation in its new home, by a geographical excursion across the American continent, to be managed and led by Professor William Morris Davis of Harvard University. For information concerning this excursion, its object, plan, scope and progress, reference is respectfuly made to the *Bulletin*, where details will be given from time to time.

For the condition of the finances reference is made to the report of the Treasurer, herewith appended.

All of which is respectfully submitted.

CHANDLER ROBBINS,
Chairman.

LEVI HOLBROOK,
Secretary.

Report of the Treasurer

The report of the Treasurer, Mr. Henry Parish, Jr., for the year 1911, was read by Vice-President Greenough as follows:

General Account

The Treasurer respectfully reports:

On January 1st, 1911, there was on hand a balance of..			$461.74
During the year there have been received for Fellowship Dues, Sales of Publications, Interest on Investments, &c., &c.....		$26,971.93	
Mortgages paid off in part.....		$875.00	
Proceeds of the property:			
No. 15 West 81st Street.....	$175,000		
less remaining on mortgage.....	$125,000.....	$50,000.00	$77,846.93
Total			$78,308.67
There have been expended for Salaries, Meetings, Library, Publications, .House Expenses, Insurance, Postage, &c.....		$26,749.79	
Invested in guaranteed mortgages.....		$50,000.00	$76,749.79
Leaving a balance on hand December 30, 1911.			$1,558.88

Report of the Nominating Committee

The Special Committee appointed Nov. 16, 1911, to nominate and recommend to the Society suitable persons to be elected in January, 1912, to fill vacancies

then existing in its offices, report that they recommend the election of the following named persons to the offices designated.

Vice-President, ANTON A. RAVEN, term expiring in 1915
Treasurer, HENRY PARISH, JR., " " 1913
Foreign Corresponding Secretary, WILLIAM LIBBEY, " " 1915
Councillors, FRANCIS M. BACON, BANYER CLARKSON, GEORGE W. FOLSOM, CHANDLER ROBBINS, PAUL M. WARBURG, " " 1915

[SIGNED.] JOHN GREENOUGH, ARCHIBALD D. RUSSELL, HAMILTON FISH KEAN, *Committee.*

The vote of the Society was unanimously in favor of the persons recommended by the Council and they were declared duly elected.

Vice-President Greenough then introduced the speaker of the evening, Charles Wellington Furlong, who addressed the Society on "Tripoli the Gateway to the Sahara." Various aspects of the city of Tripoli, the oases and the desert were illustrated by many lantern slides.

The Society then adjourned.

AWARD OF THE CULLUM MEDAL TO DR. CHARCOT. The Annual Report of the Council (p. 116) announces the award of the Cullum Geographical Medal to Dr. Charcot for his explorations and surveys in West Antarctica. This recognition by the American Geographical Society of the notable service to science and exploration rendered by Dr. Charcot have been commented upon with hearty approval by many newspapers of America and Europe.

AMERICA

ASSOCIATION OF AMERICAN GEOGRAPHERS. The Eighth Annual Meeting of the Association was held in Washington, Dec. 28-30, 1911. Through the kindness of the National Geographic Society, the sessions were held in Hubbard Memorial Hall. The President, Professor Ralph S. Tarr of Cornell University, presided, and gave the president's address. His subject was, "The Glaciers and Glaciation of Alaska." Professor Martin read a memorial of Professor Christopher Webber Hall, who died on May 10, 1911. In addition to these addresses, thirty-six papers were read by members and by several others, on invitation. Papers on subjects in Meteorology were more numerous than at any previous meeting of the Association.

On Friday evening the Association met with the Geological Society of America to hear the address of its president, Professor W. M. Davis, upon the subject, "The Relations of Geology and Geography." This was followed by a social reunion given to both societies at the Cosmos Club by the Geological Society of Washington.

The first volume of the *Annals* of the Association is now in press and will appear during the winter under the editorship of Professor R. E. Dodge.

Announcement was made of the election of the following officers for the year 1912: President, Rollin D. Salisbury; First Vice-President, Martin R. Campbell; Second Vice-President, Isaiah Bowman; Secretary, Albert Perry Brigham; Treasurer, Nevin M. Fenneman; Councillor for three years, Lawrence Martin. The next annual meeting will be held in New Haven.

THE IDAHO-WASHINGTON BOUNDARY. The boundary line between Idaho and Washington has been resurveyed by the U. S. Geological Survey, as the markings of the survey of 1873 had become largely obliterated and much of the country is now being settled. Bulletin 466 of the Survey by R. B. Marshall, Chief Geographer, is a report of the work. The report contains some of the field notes of Roland J. Reeves the original surveyor, who gave an account of the difficulties and hardships encountered in 1873 in traversing this country, much of which is now well-settled and highly prosperous. The boundary line runs through rolling agricultural and fruit country where the work was easy and also through heavily timbered mountains where continuous chopping was necessary. New posts of wrought iron were set at every mile and at every five miles were planted granite monuments with the words "Idaho" and "Washington" chiseled on their respective sides.

DR. L. A. BAUER RETURNS TO WASHINGTON. Dr. Bauer is at home from a nine months' trip of inspection of the magnetic work which is being conducted on board the *Carnegie* in the Indian and Pacific Oceans and by land expeditions in Australia and Asia. He also visited the magnetic institutions in the Pacific Islands, New Zealand, Australia, India, Burma, Java, China and Japan.

GEOGRAPHICAL SOCIETY IN MINNESOTA. A Minnesota Geographical Society has been organized at the State University, Minneapolis. Prof. Edward M. Lehnerts, of the Department of Geology and Geography, is President and Prof. F. C. Miller of the St. Paul Central High School is Secretary-Treasurer. It was proposed at the first meeting to organize a series of geographical excursions in and around the Twin cities and a committee was appointed to plan the excursions.

THE U. S. TOPOGRAPHIC SURVEY. During the fiscal year ending June 30, 1911, 23,272 square miles of the United States were topographically surveyed by the United States Geological Survey and 6,460 square miles revised, or resurveyed, making a total of 29,732 square miles. About 37 per cent. of the entire United States, exclusive of Alaska, has now been thus surveyed. These surveys are represented by more than 2,000 separate sheets.

CLASSIFICATION OF THE PUBLIC DOMAIN. During the last five years about 206,348,809 acres have been classified by the U. S. Geological Survey, and 75,239,198 acres additional have been withdrawn from public entry.

Of these areas, coal classifications covered 15,621,429 acres; classification of metalliferous land, 288,465 acres; and designation of lands enterable under the 320-acre and Enlarged Homestead Act, 190,438,915 acres. There have been withdrawn during this period 67,724,918 acres of coal-bearing land, 3,394,914 acres of oil land, 2,396,391 acres of phosphate land, and 1,722,975 acres of land believed to be valuable for the development of water power.

AFRICA

RAILROAD AT EL OBEID. The rails connecting El Obeid, the capital of Kordofan, with the Nile South of Khartum reached that city on Dec. 2, 1911. Twenty-eight

years ago, the Mahdi entered El Obeid and commanded the well-to-do class, under penalty of death, to leave their brick houses and live in tents or huts of branches so that no exterior sign should bear witness to any inequality among Mohammedans, "who are all sons of God." All the years of the Mahdist supremacy were lean years for El Obeid, whose population dropped from 30,000 to about 5,000, and to-day, it is only 12,000. But when the new road is opened for business, a new era is expected to dawn for El Obeid. The town is coming into touch, by steam rail, river and sea routes, with Khartum, Cairo and Europe. All Kordofan is beginning to feel the impulse of the new era of agricultural and commercial progress ushered in by the Khartum government; and no town in this province is so favorably situated for great growth and development as El Obeid.

The town stands in the part of Kordofan where rainfall is most abundant. Heat is less overpowering here because El Obeid stands on a plateau over 2,000 feet above the sea; and no town west of the Nile is the center of so many caravan routes. El Obeid was the only town in the Egyptian Sudan which, under the Mahdist régime, was still in some sort of touch with the outside world. The few things it still had to sell were sent west through Wadai and across the Sahara to Tripoli; and now the Anglo-Egyptian government has sent its workmen over scores of long routes radiating from the town, cleared them of scrub and other impediments to travel and fitted them to be feeders for the railroad and distributors of the imports which the new highway will bring to the capital.

Kordofan is now yielding to the government revenues that are nearly double the cost of the annual administration of the province; and its prosperity will certainly be much enhanced by the railroad to Senaar and Khartum which will partly replace and partly supplement the camels, pack bulls and donkeys that are now the only means of transportation.

Homes for White Men in Africa. Another region in tropical Africa has just been declared to be adapted for settlement by European farmers. In the center of Northern Nigeria, a British Protectorate more than four times as large as our state, are the Bauchi highlands, on whose flanks, most of the drainage of the Protectorate has its sources. It is the last part of Northern Nigeria to be explored, because the large native population were wild and hostile. The British did not enter these highlands till about five years ago and then only when they had reason to believe from ore which the natives brought out that it was rich in tin. The British then occupied these highlands and the natives are now supplying vegetable food for the whites and working in the mines. It has been proven that the Bauchi region is one of the greatest sources of tin.

The death rate among the whites there has, thus far, been about twenty per thousand a year, which is the normal rate in most temperate countries. About 600 miles north of the equator, in the latitude of Costa Rica and the central Philippines, at an altitude of 3,000 to 4,000 feet above the sea, this land is declared to be a "splendid wheat-growing country." Mr. Huddart, recently Director of Mines, Mr. Lush, Mr. Tomson and other well-known mining authorities are among those who testify that the Bauchi plateau is a healthful and fertile district where "any kind of vegetable grows well especially the English varieties," where "living is cheap, there being plenty of beef, mutton, fowls, milk, eggs, etc.," and where "the nights are quite cold, and any man who lives well ought to have perfect health." White settlement by farmers is not yet

invited. A branch railroad from the Baro-Kano line will soon be extended to this plateau. Up to this time, six large, high districts in tropical Africa have been declared to be fitted, by temperature and fertility, to be the homes of European peasantry. (Based on "Nigeria and Its Tin Fields," by A. F. Calvert.)

Dr. Hans Meyer's East African Expedition. *The Mitteilungen aus den Deutschen Schutzgebieten* (1911, Nos. 4 and 5) printed a series of letters from Dr. Meyer describing his explorations in the region west of the Victoria Nyanza including Ruanda and the Kirunga Volcanoes. From the German port of Bukoba on the west coast of Victoria Nyanza, his party went westward to Lake Ikimba, whose shape, it was found, had been considerably altered since Capt. Herrmann's survey, the open water stretching farther west, while a swampy tract not shown on the maps extends it still farther. This lake lies at the foot of the eastern plateau, which ends in a steep regular wall over 700 ft. high, running along the eastern and southern shore of the lake, and then strikes southward to Lake Burigi (called Urigi on the present maps), which was afterwards visited. Another escarpment twenty miles to the west forms the edge of the Karagwe Plateau. Between the two lies the depressed land of Ihangiro, a bush-covered wilderness, in which these two lakes are situated. Soundings show that Lake Burigi occupies quite a shallow basin. Passing through eastern Ruanda the party found that this is almost a treeless country, an original plateau dissected by erosion into long regular ridges divided by swampy valleys. A new lake called by the natives Kihonda stretches east and west across a depression twelve miles wide and about 1,000 feet below the surface of the plateau, with many bays and islands.

An interesting country partly unexplored formed by the clay-slate mountain system of northern Ruanda was crossed on the way to the Kirunga volcanoes. This old plateau is furrowed by longitudinal valleys and culminates in a semicircle of mountains, rising in Mt. Kabuji to an altitude of 8,530 feet. This is a grass land with a surprising extent of terrace cultivation, many of the population living miles away from water, the carriage of which involves enormous labor. There are many native paths, but almost no export of produce. This region slopes northward to the great lava tract formed by the outpourings from the volcanoes. Prof. Meyer ascended the highest volcano, Karisimbi and also Niragongo, now in a state of activity. He explored the islands in Lake Kivu, the largest of which he says bears the name of Ijwi, which is not the name now appearing on the maps.

On the way south to Tanganyika, the unexplored region to the southwest of Isawi was studied. The Muvisi range, hitherto supposed to be uninhabited, was found to be well-peopled and cultivated. The route led over the Rusiga to the source of the Ruvuvu, which Baumann, its discoverer, regarded as the true source of the Nile. The whole Tanganyika region was found to be suffering greatly from sleeping sickness, though the utmost efforts are being made to stop its ravages. Dr. Meyer's last letter, written from Daressalem, contains a sketch of the physical, ethnographic and economic relations of the districts traversed. He says it is very important to extend the German Central R.R. to Ujiji and to open communications from that lake port to the north of Tanganyika by steamer. This would afford the best route to the highlands of western Ruanda and Urundi, which is known as a "white man's" country, where settlement by Germans is now advocated.

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BUSINESS OF THE SUEZ CANAL IN 1911. In the past year 4,969 ships (25,417,852 gross and 18;324,794 net tonnage) passed through the Suez Canal; also 1667 smaller vessels (32,911 net tonnage). The total receipts of the canal were $26,952,400. (*Le Canal de Suez,* Jan. 22, 1912.)

ASIA

THE SANGPO-BRAHMAPUTRA PROBLEM. It is expected that this year the unexplored stretch of the Sangpo-Brahmaputra, where the river passes from the known Sangpo of Tibet through the Himalayas to the plain of the Brahmaputra in Assam, will be surveyed, and otherwise studied. The military expedition sent by the Indian government to punish the Abor tribe which killed Commissioner Williamson last year and has long prevented the exploration of the unknown part of the river, is accompanied by a number of scientists and topographers. Capt. Trenchard and Lieut. Oakes will have charge of the survey of the unknown part of the river. Botanical, zoological and anthropological investigations will also be made.

POLAR

BRITISH AND AUSTRALIAN EXPEDITIONS. The *Terra Nova* sailed from Christchurch, New Zealand, on Dec. 14, for Capt. Scott's base station in MacMurdo Sound.

Dr. Mawson's Expedition sailed from Hobart, Tasmania, on the *Aurora* on Dec. 2 and after a rough passage of over a fortnight arrived at Macquarie Island all well. This island is about half way between Hobart and the coast of Wilkes Land, on which the Australian Expedition expects to begin to work. It is said that the arrival of the party at Macquarie Island was announced by wireless telegraph, an instalment of which forms a part of Dr. Mawson's equipment. (*Geogr. Journ.,* Feb., 1912, p. 162.)

THE FILCHNER EXPEDITION. A letter has been received in Germany from Dr. Filchner, the leader of the German Antarctic Expedition dated Grytviken, South Georgia, Dec. 9, 1911. He said that on the following morning he and his party would sail, taking a course due south till they reached the northern edge of the pack ice, which they would follow to the east till they should find an opening that they could use to get farther south to the Coats Land region. (*Zeitschr. Gesell. f. Erdk. zu Berlin,* No. 1, 1912).

THE NORWEGIAN EXPEDITION IN SPITZBERGEN. *La Géographie* (Oct., 1911) gives a short account by M. A. Hoel of the work of the Norwegian Expedition which visited that archipelago last summer to continue the topographical and geological surveys carried on in previous years. Though the weather was very unfavorable for surveying, sufficient data were obtained for the making of a complete topographical map of the region between Ice Fiord and Bell Sound. A geological map of the region between the north and south sides of the Spitzberg, Wijde Bay, and Ice Fiord was also made. Photogrammetric methods were largely employed.

ECONOMIC GEOGRAPHY

WORLD'S COAL PRODUCTION. According to statistics collected by the U. S. Geological Survey and published in its *Press Bulletin* the world's coal production in 1910 was about 1,300,000,000 short tons of which the United States con-

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tributed about 39 per cent. The following table shows the coal production in short tons of the principal countries in 1910, except in those cases where the figures for 1909 were alone available:

United States (1910)	501,596,378
Great Britain (1910)	296,007,699
Germany (1910)	245,043,120
Austria-Hungary (1909)	54,573,788
France (1910)	42,516,232
Belgium (1910)	26,374,986
Russia and Finland (1910)	24,967,095
Japan (1909)	16,505,418
Canada (1910)	12,796,512
China (1909)	13,227,600
India (1909)	13,204,528
New South Wales (1909)	7,862,264
Spain (1909)	4,546,713
Transvaal (1910)	4,446,477
Natal (1910)	2,572,012
New Zealand (1909)	2,140,597
Mexico (1909)	1,432,990
Holland (1909)	1,235,515
Queensland and Victoria	1,119,708
Italy (1909)	611,857
Sweden (1909)	272,056
Cape Colony (1909)	103,519
Tasmania (1909)	93,845
Other countries	5,236,903
Total	1,278,577,812
Percentage of the United States	39.2

PHYSICAL GEOGRAPHY

THERMAL MAPS. At the Portsmouth meeting of the British Association in August, Prof. A. J. Herbertson read a paper on "Thermal Maps," in which he said that the ordinary maps of the meteorologists were not of much practical use to the geographer, who wanted a map showing the actual temperature at the bottom of the atmosphere and not that over an ideal surface. He discussed the various difficulties in the way of the preparation of such maps, and showed mean actual temperatures for January and July at the bottom of the atmosphere. From these, with certain corrections for the intertropical regions, he had prepared a map, with the assistance of some pupils, showing the natural thermal divisions of the earth's surface. As showing the value of such a map, he pointed out that it removed the popular misconception that the heating of Tibet caused the monsoons of India. The map was of great theoretical and practical value in giving the geographer precise data for a study of the thermal quality of the atmosphere in different parts of the world and in giving to colonists and others an accurate picture of the mean thermal conditions at the opposite seasons of the year in the countries in which they were interested. (*Scott. Geogr. Mag.*, Vol. XXVII, No. 10, 1911, p. 517.)

PRE-GLACIAL SHORELINES IN SCOTLAND. In the western islands of Scotland are pre-glacial shore-lines, described by Wright (Wright, W. B., *Geological Magazine*, New Series, Decade V, Vol. VIII, 1911, pp. 97-109). The pre-glacial sea-cliffs and rock benches are distinguished from the two well-marked post-glacial strands of Scotland by the presence of glacial till, overlying striae, upon the bedrock of their surfaces. They occur at heights of from 95 to 125 feet. These proofs of the elevation of the British Isles before the glacial period have long been recognized in the southern half of Great Britain but not previously in Scotland. They furnish important evidence that, before the ice age, the outlines of the British Isles were not significantly different from the present shape.

LAWRENCE MARTIN.

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CONGRESSES

THE TENTH INTERNATIONAL GEOGRAPHICAL CONGRESS. The *Scottish Geographical Magazine* says that a letter received by one of its officers from the Secretary of the Tenth International Geographical Congress, which was postponed last fall till next spring, has now been indefinitely postponed, though it is expected that the Congress will be held in Rome as soon as circumstances will permit.

EIGHTEENTH INTERNATIONAL CONGRESS OF AMERICANISTS. The eighteenth session of this Congress will be held in London, at the invitation of the Royal Anthropological Institute, from May 27th to June 12th, at the Imperial Institute. The leading topics to be discussed at the Congress are:

(*a*) The Native races of America; their origin, distribution, history, physical characteristics, languages, customs and religions.

(*b*) The ancient monuments and the archæology of America.

(*c*) History of the Discovery and European occupation of the New World. The languages admitted are English, German, French, Italian, Spanish and Portuguese. An archæological and ethnological exhibition will be held at the Imperial Institute. Sir Clements R. Markham is President of the Congress.

CONGRÈS INTERNATIONAL D'ANTHROPOLOGIE ET D'ARCHÉOLOGIE PRÉHISTORIQUES. The fourteenth session of this Congress will be held at Geneva, Switzerland, in the first week of September, 1912.

OBITUARY

CLARENCE EDWARD DUTTON. Major Clarence Edward Dutton, U. S. A., retired, died at Englewood, N. J., on Jan. 4, at the age of 70 years. He was long detailed for duty in the U. S. Geological Survey and was eminent for his contribution on volcanoes and earthquakes and for the results of his geographical studies. Among his writings were: High Plateaus of Utah, 1878; Tertiary History of the Grand Cañon District, 1881; Mt. Taylor and the Zuñi Plateau, 1884; the Charleston Earthquake, 1887; and a book, Earthquakes, 1904.

SIR JOSEPH DALTON HOOKER. This eminent English botanist died on Dec. 11, aged 95 years. When he was 21 years old he was assistant surgeon on board the *Erebus* on Sir James Ross's expedition to the Antarctic. When thirty years old he traveled extensively in the Himalayas studying the flora of that region and later he made other botanical expeditions to the east. In 1865 he became director of the Kew Gardens succeeding his father Sir William Hooker, in that position. The results of his discoveries in botany and his many contributions to that study gave him great distinction as a man of science.

R. E. YOUNG. Robert Evans Young, D. L. S., Chief Geographer of the Interior Department, Dominion of Canada, and Superintendent of the Lands Division, Department of the Interior, recently died at Ottawa, aged fifty years. For twenty years he was engaged in the land surveys of Manitoba and British Columbia and in 1904 he made a special survey of the City of Winnipeg. He was appointed Chief Geographer in 1909. Much of his attention has recently been given to the collection of data relating to the economic prospects of regions to the north of Alberta and Saskatchewan. In "Canada's Fertile Northland" and similar works with whose preparation he had much to do, he helped to

attract wide attention to the vast heritage of the Dominion to the north of the regions now developing.

FREDERIC COPE WHITEHOUSE. Mr. Whitehouse died in this city on Nov. 16, 1911. A graduate of Columbia University in 1861, he studied later in France, Germany and Italy. He became known to geographers through his discovery in 1882 of the depression in the Libyan Desert known as the Wadi Raiyan and wrote many papers on the practicability of utilizing it as a reservoir for the storage of Nile waters during the flood periods. His researches in Semitic traditions resulted, he believed, in the identification of the "Land of Goshen" with the present Fayoum which was submerged in the time of Herodotus and was then known as Lake Moeris.

GENERAL

THE AIRSHIP IN EXPLORATION. Professor Dr. H. Hergesell deems it probable that before many years the Zeppelin airship will serve a useful purpose in exploration (*Pet. Mitt.*, Vol. 57, Nov. 1911, p. 241). The improvements in 1911, he writes, have gone some ways to make the Zeppelin ship a practical and safe means of air navigation. The *Schwaben* made over a hundred trips in 1911 without an accident. It has three motors of the new type and on no occasion did the propelling machinery meet with any impairment of its service. The construction of the motors and propellers has been so far perfected that there is now practically no danger that these parts of the ship can be impaired so as to involve it in peril. The Zeppelin ships are being driven at the rate of 45 miles an hour and this increased speed has eliminated the danger from sudden gusts or strong adverse winds. From first to last no storm has yet destroyed a Zeppelin airship in the free air. Another idea that is being worked out is the practical and commodious housing of large airships. One of these structures, now being erected at Hamburg, promises to be suitable for the quick and easy storage of these vessels. The art of air navigation, he says, is still in its primary stage, but he looks for steady progress in the technical evolution of the new art. A problem now claiming attention is how to assure buoyancy in the free air for at least 48 hours while driving at full speed. When this problem is solved and also some other questions relating to the methods, the safety and comfort of air navigation, it will be possible at the present rate of speed, to cross North America in its broadest part in two and a half days and to reach unexplored land areas of the Arctic from Germany in less than a day and a half. He adds that Arctic exploration, by means of airships, will, of course, never be initiated till air navigation is a practical business like that of sea navigation.

FROST CARTRIDGES. "Frost lighting" is one of the most interesting of man's numerous efforts to protect himself and his crops against unfavorable weather conditions. In many sections of the United States ingenious and very effective methods of frost protection have been employed. In California, in particular, frost fighting has been carried to a high degree of scientific development. The careful experiments made there by Professor A. G. McAdie, for the United States Weather Bureau at San Francisco, have been of immense economic benefit to the fruit-growers of the Pacific coast. Professor McAdie has recently devised a new form of heater which has certain advantages over the old-style open fire, and also over the later forms of orchard heaters. It is called a "frost car-

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tridge," and consists of a cylindrical tube, made of heavy cardboard or other slow-burning material, filled with a mixture of crude oil, gravel and sawdust. The ends of the tube are closed with stoppers. The cartridge is suspended by a wire horizontally, about three feet below the fruit. The fire is started by removing the stoppers and applying a torch to small amounts of cotton waste, previously soaked in kerosene, placed at the ends of the cartridge * * * (*Monthly Weather Review*, April, 1911). R. DEC. WARD.

PROFESSOR CLEVELAND ABBE HONORED. The Council of the Royal Meteorological Society has awarded the Symons Gold Medal to Professor Cleveland Abbe, of the United States Weather Bureau, in recognition of the valuable work which he has done in connection with meteorological science. The Medal was presented at the Annual Meeting of the Society on Jan. 17th.

COMMUNICATION

TOLEDO, OHIO, Jan. 18th, 1912.

EDITOR BULLETIN OF THE AMERICAN GEOGRAPHICAL SOCIETY:

SIR: In the August, 1911, number of the *Bulletin* (pp. 625-626) appears a very uncomplimentary review of "Argentina and Her People of Today." As the writer of that book I can not let this review pass unnoticed in a periodical of such high standing. After quoting several alleged inaccuracies, the reviewer says the book is "worth little" except for a "hundred pages of history," because "statements are made so recklessly that no data may be trusted." In only one instance cited does the writer admit this error, and that is as to the relative position of Argentina as a producer of wheat. Albert Hale, a conservative writer, and recognized authority on South America, says in "The South Americans" (p. 89): "It is safe to say 500,000,000 acres can some day be turned to cultivation." This is in harmony with an Argentine authority that I followed. The figures quoted by the reviewer would allow less than one-third of the area of Argentina suited to agriculture, which is undoubtedly in error, and "a half billion of acres of fertile arable land," as given in my book, is nearer the truth. Dr. Hale also says (p. 91): "Only a few feet below the surface (middle Argentina) water can be found for live wells or windmills." In a publication issued by the Department of Commerce and Labor at Washington, in 1906, by Lincoln Hutchinson, and entitled "Report on Trade Conditions in Argentina, Paraguay and Uruguay," the temperature appears practically as in my book, and the Ohio Valley is given as one comparison. The historical incident of the "Reconquista" is explained in full on pages 307-9, in a way historically correct. The "rain of fish" is not given as a scientific fact, but is qualified by "it is claimed." In "Modern Argentina," by W. H. Koebel, and "Eight Months on the Gran Chaco," by Juan Pelleschi, this phenonenon is given in all seriousness. Regarding the "column of sheep" all I have to say is that the statement was certainly conservative, and not "reckless." It answered the intended purpose of a concrete illustration. The reference to Patagonia is simply an interpretation of language, and the paragraph in the book speaks for itself. These are the only "reckless statements" cited by the reviewer. I leave the judgment with any impartial reader. NEVIN O. WINTER.

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GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch.)

NORTH AMERICA

Forest Physiography. Physiography of the United States and Principles of Soils in Relation to Forestry. By Isaiah Bowman. xxii and 759 pp. Maps, illustrations, appendix and index. John Wiley & Sons, New York, 1911. $5. 9½ x 6½.

This is an admirable work and fills a gap in American geographic literature that has been hitherto quite unbridged. Six hundred of its 700 odd pages are occupied by a description of the surface of the United States from a physiographic point of view. The entire country is covered and the treatment is detailed enough to give a good picture of the land forms prevalent in its every region. All the important original sources have been drawn upon and descriptions compiled from a careful analysis of their contents. These analyses are excellent, as may be seen from the following example:

"The Aquarius, the grandest of all the High Plateaus, is about 35 miles long, of variable width, and 11,600 feet high. Its summit is clad with dense spruce forests sprinkled with grassy parks and exceptionally beautiful lakes. These are not small pools but broad sheets of water from 1 to 2 miles long. Their existence is due to differential erosion by local glaciers that originated in the higher portions of the plateau. Eight thousand five hundred to 9,000 feet was the lower elevation of the glaciers of the region and it is at this level that the terminal moraines are usually found. The high elevation of the Aquarius Plateau, 10,500 to 11,600 feet, favored the exceptional development of glacial forms in the Pleistocene, just as to-day it favors a greater rainfall and better forest cover than occur on the neighboring lower plateaus.

"The upper surface of the Aquarius is developed upon a 1,000 to 2,000 foot layer of basalt, which gives rise to marginal cliffs of exceptional height and steepness, as on the northwestern flank. Again, on the eastern border, a great wall from 5,500 to 6,000 feet high overlooks the lower country and owes its boldness largely to the hard lava cap at the summit." (p. 263. There are two references to Dutton's High Plateaus.)

Of course this represents a great amount of labor, but it has had its fruition in the only complete account of the surface of the whole country that exists in any such detail.

The author has attempted to steer a middle course between "purely descriptive writing and * * * altogether explanatory writing." The reader is evidently supposed to have had a good course in physiography—the explanatory science of land forms,—for in the first ten pages of the physiographic part occur such

technical terms as tectonic, dissected fault scarp, antecedent, peneplain, horst, tilted block structure and glacial cirques. Bowman's work makes no pretence to be an exposition of the science; it merely uses physiography for description.

The title of the book is misleading, therefore; it has the merit of being brief and distinctive. No other book has this name, and it has something to do with forests in that it is designed for the author's "forestry" students at Yale. It was obviously this aspect of the work that led to the inclusion of the hundred pages on the nature and origin of soils, as this is lacking in the text books of physiography, and students of forestry need it. If a title should tell what is in a book, this one would read "A physiographic description of the United States, with an introductory chapter on soils." "Forest Physiography" is certainly much handier.

The work appeals to all geographers and geologists, and all of them who have made contributions to our knowledge of American physiography will find their work utilized here and properly credited. It appears to be a special feature of the index that it includes the names of all authors cited for however slight a work. It thus serves as an analytical bibliography of the subject-matter. Such a work is not supposed to be read continuously but rather by parts, on reference. Nevertheless, the book is eminently readable.

Necessarily, some features described are still of disputed origin, but Bowman puts the emphasis on the nature of the features. His references make it easy for a reader who wants the opposing views to find them. For the nature of the Great Lakes country, for instance, there is no account for the general reader at all comparable to this.

The publishers will doubtless correct a number of misprints, in another printing, and refer more clearly to the Plates. The author is to be congratulated on having produced that not too common thing, a good and useful book.

MARK JEFFERSON.

Natural Vegetation as an Indicator of Possibilities of Land for Crop Production in the Great Plains Area. By H. L. Schantz. *Bulletin* 201, Bureau of Plant Industry, Washington, 1911.

Dr. Shantz's Monograph is designed primarily to aid settlers on the High Plains in judging the agricultural values of soils by the native vegetation. In this region of light rainfall practically all other soil factors are subordinate to moisture conservation, and the native plants that show a soil receptive to and retentive of moisture are indicative of the best types of agricultural lands.

Three plant groups or "associations" are described, the short grass, the wire grass and the bunch grass. The short grass with a shallow root system indicates a compact loam or "hard land" into which rain cannot penetrate deeply. Although a fertile type in humid regions, this soil is not favorable for ordinary crops in years of average rainfall.

The wire grass indicates a sandy or sandy loam soil which readily allows the penetration of rain and by its fine surface mulch conserves the soil moisture. Such a soil is too heavy to blow readily and yet is porous enough to contain an adequate moisture content.

The bunch grass is characteristic of the sand hills. It is also found on loamy ridges, on clay areas and along streams where the active soil creep breaks up the soil and makes it pervious to rain. This type also indicates soil that has a favorable moisture content.

Considerable loss has resulted to Eastern settlers who chose the "tight" loam, a soil that in humid regions would be fertile, and these lands have had selling value not justified by their crop possibilities. Those familiar with the soils have located on the more sandy soils, an interesting example of geographic response. Much interesting data of rainfall, run off, available and unavailable, soil moisture and botanical studies are given. F. V. EMERSON.

The Ice Age in North America, and its Bearings upon the Antiquity of Man. By G. Frederick Wright, D.D., LL.D. xxi and 763 pp. Maps, illustrations, bibliography and index. Bibliotheca Sacra Co., Oberlin, O., 1911. 9 x 6.

Wright's Ice Age has been for years the popular source of information as to the work of the ice and its extent in North America. The readable style and the first-hand knowledge and observation of the author make attractive reading for those who wish a general idea of the subject.

The fifth edition differs from its predecessors in a somewhat more ample presentation of the data gathered during the last ten years especially in the Mississippi Valley. The chapters on the causes of the glacial period are most interesting, affording as they do a summary of the principal theories which have been advanced. The author does not fully accept Chamberlain's hypothesis as to the rôle of carbon dioxide in the formation of continental glaciers but rather inclines to Croll's theory.

The sub-title of the book is treated in the last four chapters. The author's discussion shows his strong bias toward the idea that man's existence during the glacial period is shown by the discovery of implements of human manufacture in the drift. The discussion of this disputed question is interesting, although hardly convincing.

To working geologists, the inclusive bibliography is useful; it includes the titles of hundreds of papers that bear on the facts and problems of glaciers and glaciation. Over 200 maps and illustrations add to the value of the book.

F. V. EMERSON.

Labrador: Its Discovery, Exploration, and Development. By W. G. Gosling. xii and 574 pp. Maps, illustrations and index. The Musson Book Company, Ltd., Toronto. 9 x 6.

If this be by way of preface to Dr. Grenfell's book on Labrador, we shall await with interest the wine which has so goodly a bush. To this coming work Mr. Gosling relinquishes everything that might pertain to the biologic study of this region. For himself he has selected two principal themes, the moot points of the discovery history of Labrador and the more recent entrance of the bleak shore upon the page of history. While sedulous to attribute a credit richly deserved to Henri Harrisse for the gathering of all the shreds of documentary evidence which might be gleaned for the study of the discovery, Mr. Gosling has a credit of his own for making this material more readily accessible and for clearing up several points which have hitherto been most obscure. In connection with this branch of his theme, he has provided excellent reproductions of all known charts which bear upon the beginnings of history on this coast, and in the text has been careful to provide painstaking explanation, for it must be acknowledged that few but highly trained geographers can read to comprehension the maps of the old voyages. The mass of transcriptions of old records

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and less obvious material for the geographical study is a startling reminder of the magnitude of the long dispute over priority in this discovery. We incline to accept Mr. Gosling's conclusions as to the matter at issue, he presents most excellent argument in support of the Norsemen, and the Eskimo traditions as interpreted by him are convincing. So far as relates to the Cabots and Corte Real there is little left to debate. The matter has been satisfactorily cleared up with the comparative wealth of material now placed in our hands, and it is clear that the former uncertainty has been most largely due to the fact that each new discoverer in turn looked upon this forbidding coast as a worthless possession, an opinion tersely recorded on Ribero's map of 1529: "Labrador was discovered by the English; there is nothing in it of any value."

The author deserves commendation for the temperate statement of matters which have undoubtedly too long remained *sub judice*. There has been disorder in the setting forth of claims and in the resistance to demands considered unjust. The disputes have at times reached the pitch of hot-headed violence, unavoidable under the circumstances. Mr. Gosling supports the cause of the Canadians and that is undoubtedly right from his side of the line, and on this side the time has gone by when any great degree of animosity can be stirred up over a question which is properly a matter for arbitration. A far graver indictment against us is found in the record of the disease and death which followed the shameless cruelty of the recruiting in Labrador of a party of Eskimo for one of our fairs.

WILLIAM CHURCHILL.

Through Trackless Labrador. By H. Hesketh Prichard. xv and 244 pp. Map and illustrations. Sturgis & Walton Company, New York, 1911. $4. 10x8.

This is the record of the exploration which leads nowhere yet which is by chance productive of such good results. Actuated by curiosity to see what may lie at the back of beyond, feeling the challenge of the few areas yet remaining to our maps with the legend "unexplored," scores of the young and hardy are pushing out and making each his little strip of unknown known. Sometimes the result is a narrative, and this one appears in a handsome volume, from which the student may glean at first hand notes of value. There is at least individuality about such record, sometimes a random word or careless phrase reveals a truth which has evaded the attention of more serious observers. Sometimes, again, puzzlement results. Time and again the reviewer has turned back to the cryptic statement on page 158 at the end of a short paragraph which sums the information as to games among the Eskimo: 'Their only game nowadays is rounders, which was taught them by a missionary, whose name, not inappropriately, was Fry."

One of the most valuable notes in the whole work is pure accident, a picture of a Christmas tree in the mission house at Nain. Every candle flame is ringed with an aureole of some four inches diameter. It has its bearing on the troubled subject of ventilation. It shows that in this tightly closed room, where the winter below zero must be kept out, the air is chilled to a point where its vapor saturation must exist in the form of invisible frost spicules; only in the heat of the candle flames is the frost melted and the light reflected on the frozen shell has found a record on the sensitized plate. The narrative is interesting throughout; its value will depend on the use which may be made of its really valuable notes. As each student must collate those for himself, the inconvenience of the absence of an index is lessened.

WILLIAM CHURCHILL.

Saddle and Camp in the Rockies. An Expert's Picture of Game Conditions in the Heart of our Hunting Country. By Dillon Wallace. xvi and 302 pp. Illustrations. Outing Publishing Co., New York, 1911. $1.75. 8½ x 6.

The results of a journey with saddle and pack animals, begun in Arizona and pursued northward into Montana, nearly 2,000 miles, the principal purpose being to study at first hand the big game conditions.

Through Southern Mexico. Being an Account of the Travels of a Naturalist. By Hans Gadow. xvi and 527 pp. Map, illustrations and index. Witherby & Co., London, 1908. 18s. 9 x 6½.

When travels of a Naturalist are properly handled in writing, they can never fail to be of special interest to Geography. In the present instance we can only commend the leading part assigned by the author to his special branch of research. Zoology justly appears as the preponderating theme and subject and it is entertainingly interwoven with descriptions of the countries and not too much loaded with personal experiences not germane to the subject. Mr. Gadow has also illustrated the volume in a manner making it a reasonable picture-book, not a would-be scientific "struwelpeter," as is too often the case, with the present tendency of making of the text a sort of foot-notes to pictures.

He naturally begins with the valley of Mexico, and on that occasion devotes considerable (not too much) space to the interesting Siren or "Axolotl" of the waters of Lake Tezcoco. Here we must observe, that one of the few failings of the author is to meddle with things of which he knows nothing, among which the aboriginal languages of Mexico are specially prominent. His etymology of the word "Axolotl" is an evidence of it. He ignores the fact that that word is composed of "Atl" (which fact he recognizes) and "Xolotl," which means dwarf, so that "water dwarf" is the true meaning of the name, just as "old dwarf" that of the turkey. Again his criticism of the building of the city of Mexico on the site of the ancient Mexican settlement as "insanity" only shows ignorance of conditions of the Spaniards in the early decades of the sixteenth century.

In Chapter II, a very good dissertation on the Agave, its numerous varieties and on the far-famed beverage "Pulque," is inserted; then we are led up the volcano of Orizaba by means of a description by somebody else who made the ascent. Zoological and botanical references of merit and popular value enliven the very readable text. As a naturalist Mr. Gadow is never tiresome. Then, from Cordova, he turns to the South.

Chapters (IV and V) devoted to a picture of tropical forests and forest-life are excellent. Although his visit to such sections was made in a Pullman car, they are full of information, and enjoy a vivid picturesqueness showing that he felt understandingly, saw correctly. Not to fall into constant repetitions, we will state, once for all, that these valuable traits go through the whole book, whenever nature comes into play. He admires sincerely but intelligently and never tumbles into the pitfalls of sentimental rapture. The same may be said of his allusions to people. Not much of what is now termed "ethnological" is found in the detail, but there is the true "Ethnology," by one who has looked well, and with a large degree of impartiality. Of all the nationalities he alludes to, Americans come off worst. They seem to be looked at as illegitimate competitors in a country that escaped British sway.

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Thus the author carries us rapidly, but agreeably, not on a connected trail, as far as the State of Colima in western Mexico. The book ends with a narrative of an ascent of Popocatepetl and a chapter dedicated to the Colima, Mexican volcanoes in general, and some most interesting zoological notes. Whenever Mr. Gadow treats of animals or plants he is at his best, one feels he is perfectly at home.

This cannot be said in regard to his incursions in the field of aboriginal history and linguistics. His acquaintance with these subjects can be qualified as a—vacuum encompassed by atmosphere. No vacuum being perfect, very few molecules appearing as knowledge may be faintly discerned. This is regretable, as all the rest is good, and entertaining, so that the unsophisticated reader remains under the impression that all is alike trustworthy. Chapter XV has, as its bouquet, one of those dismal arithmetic arrays of jugglery applied to so-called Indian Chronology. It might very well have been omitted, there was no need to increase the already deplorable list by one more.

AD. F. BANDELIER.

SOUTH AMERICA

Lands of the Southern Cross. A Visit to South America. By the Rev. Charles Warren Currier, Ph.D. 401 pp. Map, illustrations and bibliography. Spanish-American Publication Society, Washington, D. C., 1911. $1.50. 8 x 5½.

This book was written by a delegate of the United States to the International Congress of Americanists at Buenos Aires, and it is an account of his journey to Buenos Aires from New York via Bahia, Rio de Janeiro, Santos and Montevideo and his return via Santiago, Valparaiso and the west coast. It covers the same ground as a number of other books on South America. The author is a priest of the Catholic University of America and his office brought him into contact with ecclesiastics and gave him a better opportunity than other authors have had to obtain an insight into the religious life of the country. This is the personal equation and in this alone can the book be considered a new contribution. In every city a call was made at the cathedral and a careful and well-balanced statement is made concerning the religious status.

R. M. BROWN.

AFRICA

British and German East Africa. Their Economic and Commercial Relations. By Dr. H. Brode. xiv and 175 pp. Illustrations and map. Longmans, Green & Co., New York, 1911. $2.10. 6 x 9.

A timely book by an authoritative writer dealing with the economic development and commerce of British and German East Africa and the interrelations of these Protectorates. They have profited greatly by each other's experiences. The Germans found that there was great economic value in beeswax. The quantity exported in one year was worth $365,000. Observing the success of this trade, the farmers in British East Africa took it up and their exports in 1907 were worth $450,000. The results of the Uganda railroad stimulated the Reichstag to grant means for the prolongation of the Usambara and the construction of the Central railroads in German East Africa. The gradual development of these contiguous German and British possessions is continually bringing

them into close economic relations. Fourteen per cent. of the total trade of German East Africa in 1909 was through British East Africa and Uganda via the Uganda R.R.

Most of the new industries introduced into these Protectorates met with great discouragement at first. The cultivation of cotton began to suffer from various pests soon after it was introduced, but the industry is now well-established, and this is partly due to the constant exchange of experiences and correspondence between the Kolonialwirtschaftlichen Komite and the Cotton Growing Association. When sisal cultivation in German East Africa began in 1893 only 6 per cent. of the 1,000 plants imported from America survived; but about 20,000,000 plants are now thriving on the plantations of German East Africa; and British East Africa is going into the industry. The German Protectorate in 1908 had 570,000 cocoanut trees of bearing age on their European plantations. The British plantations across the border were started later and several years must yet elapse before they will yield returns.

Among the interesting discoveries have been the German gold mines of Sekenke, now yielding considerable profit; the large tannin content of mangrove and black wattle, now a new source of wealth in both Protectorates; and two soda lakes, one on the English and the other on the German side of the line, which will yield bi-carbonate of soda in abundance. These are only a few facts from the large amount of data, interestingly presented, which appear throughout this valuable book.

Fachoda. Le Partage de l'Afrique. Par Gabriel Hanotaux. xii and 357 pp. 2 maps. Ernest Flammarion, Paris, 1909. Fr. 3.50.

The book is not only a history of the Fashoda incident, but also a review—from the French point of view, of course—of the events and circumstances which led to that critical episode in French colonial history. As an actor and witness of that drama, Mr. Hanotaux, the former Minister of Foreign Affairs, is certainly a most authoritative writer on the subject, and what gives his statements even more weight is the complete collection of the authentic documents relative to those events which he reprints in the appendix to corroborate his story.

Yet the book is more than a political treatise. Starting from the thesis that, while the rivalry of the French and English in Africa was certainly the direct cause of the Fashoda clash, one would nevertheless fail to understand its true character unless it be assigned its place in the history of the dividing up of Africa. The author gives, in the first part, an excellent *résumé* of the great discoveries of the Nineteenth Century and the political claims which were based on them by the different nations; he explains the geographical reasons why the range of exploration was so long limited to the coasts, and then shows how the different political claims finally narrowed down to those of France and Great Britain. He shows how the upper Nile country was predetermined to become the bone of contest, and proves, on documentary evidence, that France had been at all times doing her best to secure an amicable agreement and would have secured it about Fashoda as well if the imperialistic party in England had not preferred the conflict. For Great Britain had long been informed that France wanted an access to the Nile for her Central African empire, and had, as late as June, 1898, concluded the treaty acknowledging the French claims east of Lake Chad without saying a word about the Nile. The expedition of Gen.

Marchand had not a military but a scientific character, for it was to study that access to the Nile and to ascertain a basis on which to agree on the claims of the two powers in the Bahr-el-Ghazal country. It was no wonder, therefore, that it fell an easy prey to Lord Kitchener; and the people failing to support their government, France was obliged to accept the boundary as drawn by Great Britain.

In concluding, the author gives an outlook on the future of Africa in which he reviews the possibilities of the continent. He shows, on the force of geographical and economic arguments, that the obstacles which once prevented the opening up of Africa were obstacles only as long as the policy of small means was prevailing. The hidden treasures of the Dark Continent, he says, will be exploited as soon as adequate apparatus is employed, and modern man will not hesitate to use large means in order to reap large profits. In the course of this process, Africa will finally belong to those who know how to cultivate her best.

M. K. GENTHE.

England in the Sudan. By Yacoub Pasha Artin. Translated from the French of the Author by George Robb. xvi and 251 pp. Map, illustrations and bibliography. Macmillan & Co., Ltd., London, 1911. $3.25. 9 x 5½.

This is an account of a journey along the two great branches of the Nile. The book is divided into five parts based upon the different stages of the trip: First, an eleven days visit in Khartum, a trip from Khartum up the Blue Nile as far as Rosaires and back, another stay in Khartum, a trip up the White Nile as far as Gondokoro near the Uganda Protectorate and back to Khartum, and finally some general notes on the Anglo-Egyptian Sudan and its inhabitants. The first four parts of the book are in the form of letters written to the author's wife. He gives accounts of many events in the Sudan, so that a wide range of subjects is treated. In many cases he repeats the stories of interested parties, eye-witnesses or otherwise, and thereby gains somewhat in local color. The large problems of the Anglo-Egyptian Sudan such as slave raiding, the ownership of building-lands, the character of government officials, the transportation problem, the place of the native races in the governmental scheme, etc., are brought to the reader's attention. The last section of the book departs from the epistolary style and supplies a logical account of the Anglo-Egyptian Sudan and the Sudanese. Many excellent pictures are included and a map of Sudan.

R. M. BROWN.

ASIA

Amurath to Amurath. By Gertrude Lowthian Bell. xvii and 370 pp. Map and illustrations. E. P. Dutton & Company, New York, 1911. $5. 9 x 6.

Under this cryptic title, which is nowhere explained in the book, Miss Bell describes a journey made in the spring of 1909 from Aleppo down the Euphrates to Kerbela and Bagdad, then back up the Tigris to Kharput, and thence westward to Cæsarea and the German railroad in central Asia Minor. By reference to the new Britannica one learns that Amurath is another form of the Turkish name, Murad, and Murad is the name of one of the chief tributaries of the Euphrates. The title means "From Euphrates to Euphrates" and is well chosen, for the book is primarily an account of the little-known left bank of that river from Carchemish almost to Hit. To those who were delighted with Miss Bell's volume on Syria, "The Desert and the Sown," the present volume will be some-

thing of a disappointment. There is the same vivid description, the same inimitable reproduction of most enlightening conversations with the natives; but there is far too little of these things. The bulk of the book consists of detailed descriptions of ruins and of the relation of one type of architecture to another, interesting to the archæological specialist, but apt to be skipped even by a conscientious reviewer. A good deal of the rest of the book is devoted either to the ordinary traveler's tales, well told but elucidating no new principles, or else to comments on the fact that Kiepert's last map is in error.

Nevertheless, the book is interesting, and gives the reader a new point of view in three important respects. In the first place, the poverty and desolation of the greater part of Mesopotamia is sad to think upon. Little patches of cultivation close to the great river and often in danger from its floods, and a vast desert peopled by starving Arabs extending indefinitely on either side—that is all there is. In the second place, this desert is full of ruins. All the world knows this fact, but it will be a surprise to most readers to find not only that ruined villages are scattered in such extraordinary abundance that one comes upon them every two or three miles in many places, but also that so large a proportion date from the relatively recent period of the Moslem empire of the Caliphs in the middle ages. The third and perhaps most important point brought out by Miss Bell is the contrast between the immovable inertia of the people of Mesopotamia and the relative mental activity of the Syrian coast and still more of European Turkey. In no part of the Turkish Empire are the people alert in the manner of the inhabitants of Western Europe and America, but the difference between Mesopotamia and the Balkans seems to be almost as great as between the Balkans and Germany. This cannot be wholly a matter of race, but Miss Bell does not attempt to explain it. She is content to set forth the fact most convincingly by quotations from conversations on the political situation. In central Asia Minor the peasants have almost no idea of what the new régime means, but in Mesopotamia they scarcely seem to know that there is such a thing. How little the people think and how well Miss Bell hits off their salient characteristics is apparent from the following quotation:

"On the Syrian side the Euphrates is hemmed in here by hills whereon stands the castle of Salihiyeh. In this wilderness we came upon some Arabs who were ploughing up a desolate spot in search of locusts' eggs.

"Are there many locusts here?" said I, for locusts are not accustomed to lay their eggs in the sand.

"No," they answered, "there are none here; but, as God is exalted, there are thousands lower down."

"Then why do you plough here?" I asked with the tiresome persistence of the European.

"The government ordered it," said they, and resumed their task."

ELLSWORTH HUNTINGTON.

Among the Tribes in Southwest China. By Samuel R. Clarke. xv and 315 pp. Map, illustrations, and appendices. Morgan & Scott, Ltd., London, 1911. 8 x 5½.

China at its edges must write the best commentary that can be established upon China at its very heart. It is at the marches that we are to look for the true spirit of Chinese culture as a civilizing force, if any such it has. In these pages we have the record of daily observation for a long life of activity of one

capable of observing what China has been able to do in centuries of intercourse with alien races and earlier inhabitants of a soil upon which Chinese expansion long ago established itself. With a recognition, as valuable as it is rare, that the record of missionary endeavor complicates the reading of the story of distant and little-known folk, the author has split his book fairly in the middle, half is ethnographic record, half is devoted to the story of the propagation of the faith. This honesty of purpose will attract the reader, the missionary pages will be found as interesting and very nearly as instructive as the former section of the book. The tribes with whose history and welfare Mr. Clarke has so long been engaged are the Miao of the province of Kweichow, which lies between Hunan and Yunnan, south of Szechwan and north of Kwang-si. Linguistically they are provisionally associable with the tonal languages which appear seated at the head-waters of the great streams which in their lower courses have become the homes of the rich cultures of Burma, Siam and Cambodia. Without strength to hold their own against the Chinese advance, too powerless to fight their way to new homes, the Miao have remained in a condition of practical slavery, a clear proof of the immiscibility of Chinese culture even with races not far from the same ethnic and culture horizon. In two chapters the author deals briefly with the Chung-chia, for whom he finds identification with the stock of the Shans of northern Burma, and the Lo-lo or No-su for which a Tibetan origin is sought. WILLIAM CHURCHILL.

The Changing Chinese. The Conflict of Oriental and Western Cultures in China. By Edward Alsworth Ross. xvi and 356 pp. Illustrations and index. The Century Co., New York, 1911. $2.40. 8½ x 6.

China is changeless, China is changing every hour of these its crowded days. These are all a matter of choice. To those who have essayed to create a gross psychology, the psychology of empires, China has long stood as the stock evidence of a land whose arteries have hardened and which has passed into a sort of senile communal decay, uninterested save from hand to hand in daily routine and unaroused as to a future which neither dismays nor attracts. To those who seek to follow the course of that which purports to be news, there seems a new and vivid China, a land of revolution, of a resurrection from Manchu death, a land of republican ardor. Before we can comprehend this China which changes not and this China which is fairly spinning, who can comprehend our old friend Wu Ting-fang? Is this leader of republican activity in a land which tried out and discarded the republic 2,000 years ago, is he the mystic Oriental and real? Is he wholly artificial, the creation of the American newspaper man? Frankly, I believe the latter; not only have I had a part in the creation, but I have had this belief confirmed by a Chinaman so high in the councils of his land that the Wu Ting-fangs were but the pawns with which he played the great game. Is China changing? Who knows? The chapters of this volume are little more than a year old in their former magazine source, yet Prof. Ross caught no glimpse of such an impending change as we are led to believe, yet on no authority that we can wholly trust, is now taking place in the Middle Kingdom. But change or no change, we have here an interesting story of competent observation. It is exterior observation of necessity, it is a series of judgments of the superficial Chinaman on a China surface beneath whose glaze it is so difficult to penetrate. But not of the same necessity is it superficial judgment; far from that, the author approaches his task with a recog-

nition that the simpler the standard of measurement the more accurate the record. Of all this manner of investigation one character is fundamental, the Chinese are judged by their capacity for the absorption of Occidental custom, quite forgetting that much of the basic principle of all this new Occidentalism is matter which China has already experimented with and has discarded as not adapted or adaptable to its national life. Our author's own science of sociology is by no means cordial to all of Occidental development in its own home, and he should be the last to expect it to be adopted in its known imperfection by a race who were thinkers when Noah was but a weather prophet. Yet we welcome this book, welcome it in a season when books on China come in crowds, for it has a saving grace in its willingness to set before the reader the fact that in China are men like-minded with ourselves.

WILLIAM CHURCHILL.

From Western China to the Golden Gate. The Experiences of an American University Graduate in the Orient. By Robert Sprague. 128 pp. 30 illustrations. Lederer, Street & Zeus Co., Berkeley, 1911. 7 x 5.

This book contains a brief description of a trip from Chentu, in the Tibetan borderland of China Proper, to San Francisco. It is a traveler's story of the scenes and incidents of the journey which was made by sedan chair, by rafts and by various types of boats through interesting sections of the Empire. The book gives but a fleeting glance of the country except in two chapters, one of them reporting a visit to the sacred mountain of China, Omei, and the Great Buddha, and the other detailing the appointments and the arrangements of a Chinese inn. As an appendix is a long chapter on the recent and radical changes (the book antedates the inception of the rebellion), which deals largely with the betterment of the river transportation into the interior and the partial elimination of beggary in western China. The work contains a number of excellent pictures on a variety of themes, while the text is, to a great degree, simple in its character, so that for certain aspects of Chinese life it may be used as a geographical reader.

ROBERT M. BROWN.

India and the Durbar. A Reprint of the Indian Articles in the "Empire Day" Edition of THE TIMES, May 24th, 1911. Index, viii and 356 pp. Macmillan & Co., Ltd., London, 1911. $2. 8½ x 5½.

Even the wise prevision which induced a great newspaper to provide in a topical and timely special edition the valuable articles which now appear in this volume could not have looked for the dramatic turn which the recent durbar has taken, the restoration of Delhi to its former glory, but now as the capital greater than India has ever known. For the first time since Disraeli added the imperial surcharge upon the style of British kings an English monarch has gone into the oldest of the remaining possessions of the British Empire which are truly imperial. There was display at the durbar, the pomp of Asia is yet potent in many ways; how far the glitter of jewels, the tread of marching elephants, the homage of tributary princes, even the superposition of a crown whose history is written but in last year's journals of the goldsmiths, how far all this will avail to check the great Indian unrest—all this is foreign to the purpose of a literary review to discuss. But the conditions which remain when the howdahs and gay caparisons are taken from the elephants, when the princes go back to squeeze their tribute from complaining masses, these are the theme of the sev-

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eral essays by distinguished hands which make up this volume. The best feet are foremost, that of course. The most encouraging views are here set forth, for Empire is now a fetich in the great little island which bears such a load of the burden of Atlas. Cheerful, hopeful, interesting, these pages are a record of what should be, a commentary on what India is.

WILLIAM CHURCHILL.

EUROPE

British Rainfall, 1910. By Hugh Robert Mill, Director of the British Rainfall Organization. The fiftieth annual volume, 1910. 328 pp. Maps and illustrations. Edward Stanford, London.

We heartily congratulate Dr. Mill on the appearance of the fiftieth volume of the annual report of the British Rainfall Organization. This unique body of observers, organized originally by the late Mr. George J. Symons, and then numbering but a few hundreds, now numbers nearly 5,000. Five of the observers whose records appear in the fiftieth volume also contributed to the first volume. In the present issue the Director makes his first Report to the Trustees, who, as already noted in the *Bulletin*, have now general charge of the property and work of the Organization, Dr. Mill being the Director and being actively responsible for all the details and all the results. Another change is the rearrangement of the stations by river basins, the counties being retained as the units. A special illustrated article explains the new arrangement. The cartographic treatment of the rainfall records has also been carried farther than in previous volumes. We note, also, a very practical article on "The Rain Gauge in Theory and Practice," in which the following points are taken up, *e. g.*, the ideal rain gauge and why it is unrealizable, requirements of a real rain gauge, the placing of the gauge, the precision of rainfall observations. In the account of "Heavy Falls on Rainfall Days" there are some noteworthy photographs of hail which fell on June 9, 1910. One of these shows hail on a lawn an hour after the fall. Another shows hail in a village street three hours after the fall. A third gives a view of a mass of compacted hailstones in a ditch after four days. A fourth represents this same mass lifted out of the ditch and set upright on a foot-bridge. We note, with special satisfaction, Dr. Mill's continued attention to the amount of rain which falls in individual cyclones, which he charts by "cyclonic units" with the track of the depression in each case shown on the maps. R. DEC. WARD.

Sketches of English Life and Character. By Mary E. Mitford. 320 pp. 16 reproductions in colors from the paintings of Stanhope Forbes, A.R.A. A. C. McClurg & Co., Chicago, 1910. $1.75 net.

A companion volume to "Tales of Irish Life and Character," and equally well illustrated. In her text, Miss Mitford has well succeeded in presenting the atmosphere of "Old England." D.

Tales of Irish Life and Character. By Mrs. S. C. Hall. 323 pp. 16 illustrations reproduced from the paintings of Erskine Nicol, R.S.A. A. C. McClurg & Co., Chicago, 1910. $1.75 net.

The eleven sketches are highly entertaining and the reproductions in colors from the pictures by Erskine Nicol add greatly to the value of the text. It is

seldom that a book is so beautifully and so adequately illustrated. The pictures are well drawn, well composed, and the reproductions are exceptionally good in color, being free from the usual crudities of color work of this kind.

D.

Beautiful Britain. The Channel Islands. By Joseph E. Morris. 64 pp. 12 illustrations and index. Adam & Charles Black, London, 1911. 75c. 9 x 6½.

The Jersey, Guernsey, Alderney, Sark and lesser islands that compose the Channel Islands are here described in their picturesque aspects with many historical allusions and remarks on early buildings and other antiquities. The plates, though highly colored, are pleasing. In a few words on the famous cattle of Jersey and Guernsey the author speaks of the Jersey cow as "rather big" while Guernsey "has a smaller breed of cattle," a statement that may surprise American owners of these breeds.

GENERAL

Accidents of an Antiquary's Life. By D. G. Hogarth. x and 176 pp. 40 illustrations. Macmillan & Co., Ltd., London, 1910. $2.50. 9 x 6.

The title does not well convey the gist of the contents until the volume has been read, then it seems very appropriate. The chapters deal with the diversions, the journeys and the complications associated with the work of the author rather than with his calling. The book opens with a modest account of Hogarth's introduction to archæology. Then follows a complete departure from the chosen path of the antiquary while following the author's experiences as a reporter for an English newspaper during the trouble in the Balkans. All this is told in an interesting and fascinating way. With it all there is given a glimpse of Crete, which was the scene of his journalistic career. Next, and now once more as an antiquary, the story of Lycia and its inhabitants is considered. Then back he goes to Crete. Included in this chapter is a forceful account of extensive erosion during a gale which swept the island. The spectacle is vividly described, and while it was perhaps unusual because of its suddenness, it gives a good illustration of changes which are more generally recorded over a series of years. The story is a capital account of excessive erosion, and one cannot be surprised that the beholders "cowered watching how primeval earth was carved." The next chapter describes the Nile fens. The delta area has rarely been brought to attention so strongly as by this short chapter, though it deals with very limited phases of it. This chapter and the account of the storm mentioned above will be, to those who seek vivid impressions of lands and natural forces, the most interesting portions of the book. Following is an account of a cruise in Levant waters, the Satalian Gulf and Cyrene. The author then gives to the layman a taste of his work as a "digger." He takes for his example the work on the great Artemision at Ephesus. The author seems to have chosen his most revolting example to depict and he does it with a keen knowledge of the possibilities of our language to convey such impressions that the reader is likely to agree with the closing words of the chapter: "Not too nice a trade, you see. Best let it be!" The book is written in a charming style and contains a number of illustrations of a variety of objects.

R. M. Brown.

My Climbing Adventures in Four Continents. By Samuel Turner. x and 283 pp. Illustrations, appendix and index. Charles Scribner's Sons, New York, 1911. 9 x 6.

A fascinating account of climbing on many noted mountains, Mount Blanc and the Matterhorn in Europe, the Altai in Asia, Mount Cook in New Zealand, and Aconcagua in South America. In addition, and fully as interesting, are the records of rock climbs in England, where feats of great difficulty, but without the complications of snow, ice and intense cold, were successfully accomplished. The author began his work in the Alps but soon turned his attention to other mountain peaks. The trial of Belukha of the Altai group during the winter season reads like an extremely hazardous if not foolhardy attempt and somewhat belies the author's insistence on carefulness with which the volume closes. In addition to the extreme cold, this peak was attempted without a base of supplies, the assistants refusing to advance, and, alone, the writer doggedly pushed on until, stiff with cold, sick, with eyes practically closed by inflammation, a mis-step nearly swept him down the mountain side in an avalanche, and the mountain was left, unconquered.

Quite a different story is the chapter on the first and only traverse of Mount Cook. The beginning of the climb was made under favorable circumstances—all the aggravating and strength-consuming preparation experienced in Siberia was wanting—and with three companions, this famous mountaineer successfully went over the summit of Cook. The climb was, of course, extremely dangerous, and the descent on the icy slope was painful, but in this instance Turner exhibited the most painstaking care without which the slope could not have been conquered.

The writer speaks modestly of his work as an author, being, as he says, "a commercial man, not a literary man"; but he may well be proud of his work as a climber, and "this plain, uncolored narrative" has for the person interested in mountains much that is worth reading. R. M. Brown.

Le Ciel et l'Atmosphère. Par Louis Houllevigue. xii and 304 pp. Armand Colin, Paris, 1911. F. 3.50. 7½ x 5.

The present writer is glad that the boundaries of our science are hazy if it brings books like this to his table. He must confess, however, that it concerns itself rather with cosmogony and physics than geography. But since 1885, when Miss Clerke's History of Astronomy in the Nineteenth Century appeared, there has come to his hands no such charming account of recent scientific progress.

The chapters on the Synthesis of Light and Wireless Telegraphy are admirable. "The work accomplished belongs to three of the brightest geniuses humanity has possessed, Faraday, Maxwell and Hertz. To-day we can see it in its completeness with its twofold scientific and practical crowning: the synthesis of light and wireless telegraphy" (p. 131). This synthesis of light is not quite what we of an older generation would suppose. Octaves have been borrowed for us from acoustics to think of light waves. The higher ray has half the wave length of the lower. Starting with a ten thousandth of a millimeter, two such octaves cover the tiny wave-lengths of the ultra-violet rays, a third all visible light, then six the invisible rays of heat when we encounter a gap of six octaves more. Below this gap we find the electric waves of Lampa and of Hertz from the sixteenth to the nineteenth octaves, the carriers of the "wireless." A giant Ruhmkorff coil can generate waves of six meters length; Lampa's tiny coil, of the size

of a sewing machine bobbin, waves of four millimeters. We are prepared to find the agitation of the ultra-microscopic electrons generating the almost infinitely short waves of light.

They are grave matters that the author handles lightly. Eighteen brief lines picture Rutherford's magnetic detector (p. 185). Another twenty-five include both history and account of the Lodge coherer. No diagrams are used. He is a literary man, showing principles, not mechanisms. The grace of treatment reminds a reader of Miss Clerke, though he misses her fuller bits of biography.

Ultra-violet rays (p. 119) produce ozone from air. "Chemists regard the molecule of oxygen as formed by the marriage of two atoms of oxygen. This union, for the most part peaceful enough, is troubled by the addition of a third atom of oxygen; these three atoms of oxygen, in forced companionship, constitute ozone. Ozone is exasperated Oxygen." Svante Arrhenius is told in this connection that a space filled with ultra-violet light would be deadly to any spores that attempted the voyage between planets. We have long recognized in our atmosphere a shield from the incessant bombarding of meteoric grains. Here we learn of it as no less a shelter from the fatal ultra-violet rays.

A chapter of most timely interest is on the flight of birds. The most geographic chapters, principles of meteorology and forecasting the weather, have less of special interest. Guilbert's method of forecasting the paths of cyclones by studying the surface winds is a good feature, not only for its intrinsic interest but also for the admirable way in which it is described. At this point are inserted the only diagrams in the book. "Men say of meteorology, if it is a science, what is it good for? What does it do?" The author answers. "It gathers data and takes *means!* If it did not rain as predicted at least there were sixty-five chances in a hundred that it would!" The reference to the Gulf Stream is less happy.

Altogether it is a delightful volume of essays of astonishing clearness. If these notes on it lack unity, so does the book. But if its nine chapters are loosely connected, perhaps some of them attain a higher interest than can be long maintained. MARK JEFFERSON.

The Evolution of Plants. By Dukinfield Henry Scott. 239 pp. Illustrations, bibliography, and index. Henry Holt & Company, New York, 1911. 75 cents. 7 x 5.

This is a book of the Home University Library of Modern Knowledge series and is advertised as "the story of the development of flowering plants, from the earliest geological times, unlocked from technical language." The book is not, however, a popular treatise. It opens with a statement of the Darwinian theory of natural selection as a cause of evolution and, with this as an assumption, proceeds to trace, through the geological history as it is recorded in the fossils, the course which plants in their evolution have followed. A selection of groups of plants is made for treatment, so that the scope of the book is limited to the fossil evidences of the flowering plants, the seed plants and the higher spore plants. By the use of these groups a somewhat logical connection is made with the first known plants of the paleontological series to the highest types of the present. The flowering plants are traced back to the highly organized Mesozoic seed plants, and the seed plants in turn are traced back to the spore plants of the Paleozoic period. No attempt is made to suppress the difficulties in the acceptance of the evidence and the book in its clear presentation of the present status makes a strong plea for further investigation. ROBERT M. BROWN.

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OTHER BOOKS RECEIVED

THE IOWA. A reprint from *The Indian Record,* as originally published and edited by Thomas Foster, with introduction, and elucidations through the text. By William Harvey Miner. xxxv and 100 pp. Map, illustrations and index. The Torch Press, Cedar Rapids, Iowa, 1911. $1. 8 x 5½.

SPRING FLORA OF THE WASATCH REGION. By A. O. Garrett. xii and 106 pp. Index. Skelton Publishing Co., Salt Lake City, 1911. 7½ x 5. [The Flora contains practically all the plants that blossoms in the spring in that region on the eastern edge of the Great Basin].

A BIBLIOGRAPHY OF WISCONSIN'S PARTICIPATION IN THE WAR BETWEEN THE STATES. Based upon material contained in the Wisconsin Historical Library. Compiled by Isaac Samuel Bradley. ix and 42 pp. Index. Wisconsin History Commission, May, 1911. 9 x 6.

THE PATHBREAKERS FROM RIVER TO OCEAN. The Story of the Great West from the Time of Coronado to the Present. By Grace Raymond Hebard. x and 263 pp. 4 maps, illustrations, bibliography and index. The Lakeside Press, Chicago, 1911. 7½ x 5. [A condensed story of the pioneers in the unsettled and unorganized territory of the West.]

PRACTICAL FORESTRY IN THE PACIFIC NORTHWEST. Protecting Existing Forests and Growing New Ones, from the Standpoint of the Public and that of the Lumberman, with an Outline of Technical Methods. By E. T. Allen. 130 pp. Western Forestry and Conservation Association, Portland, Ore., 1911. 50c. 9 x 6.

THE UNIVERSITY OF VIRGINIA. Memories of Her Student-Life and Professors. By David M. R. Culbreth. 501 pp. Illustrations and index. The Neale Publishing Company, New York, 1908. $5. 8½ x 6.

THE WESTERN GATE. By Patrick H. W. Ross. iv and 153 pp. Maps. Dodd, Mead & Co., New York, 1911. 75c. 7½ x 5.

LOVELL'S GAZETTEER OF THE DOMINION OF CANADA. Containing the latest descriptions of over 14,850 cities, towns, villages and places; together with Newfoundland, etc. Edited with an introduction by G. Mercer Adam. Fourth Edition. xlix and 970 pp. John Lovell & Son, Ltd., Montreal, 1908. 8½ x 6. [The only work of its kind in Canada and a valuable book though in need of revision to include the results of the last census and notices of many new settlements.]

LES CINQ RÉPUBLIQUES DE L'AMERIQUE CENTRALE. Costa Rica—Guatemala—Honduras—Nicaragua—Salvador. Par Le Comte Maurice de Périgny. 259 pp. Map and 26 photographs. Pierre Roger et Cie, Paris, 1911. Fr. 4. 8 x 5½. [A careful account of the industrial, commercial and financial conditions of these republics.]

MEXICO. A General Sketch. Compiled by the Pan American Union. John Barrett, Director General. Francisco J. Yánes, Assistant Director. xvii and 389 pp. Maps, illustrations and index. Washington, D. C., 1911. $1. 9½ x 6½.

EL CLIMA DEL ALTIPLANO Y LA EXTENSION DEL LAGO TITICACA con relación

á Tihuanacu en épocas prehistóicas. By Arthur Posnonsky. Map and illustrations. Tipografia Commercial de Ismael Argote, La Paz, 1911. 8 x 5.

THE TEN REPUBLICS. An introduction to the South American Series in Porter's Progress of Nations. By Robert P. Porter. x and 292 pp. 12 maps and index. George Routledge & Sons, Ltd., London, 1911. 2s. 6d. 7½ x 5. [A concise review of the history and the economic and industrial progress of the South American Republics.]

LE MAROC IL Y A CENT ANS.. (Souvenirs du Chirurgien W. Lemprière.) Annotés d'après les Documents d'Archives et les Mémoires. By Albert Savine. In series: Collection historique illustrée. Illustrations. 190 pp. Louis-Michaud, Paris, 1911. 7½ x 5.

GUIDE DU COMMERCE ET LA COLONISATION A LA CÔTE D'IVOIRE. 260 pp. Maps and illustrations. Office Colonial, Galerie d'Orléans, Paris, 1911. Fr. 5. 10 x 6½. [An authoritative work on this colony.]

THE MONKEYFOLK OF SOUTH AFRICA. By F. W. Fitzsimons. xv and 167 pp. 60 illustrations. Longmans, Green & Co., New York, 1911. 8½ x 6½. [Most of the pictures of monkeys are from photographs of the animals taken in their natural habitats. A book of facts especially intended for young readers.]

HANDBOOK OF THE SOUTHERN NIGERIA SURVEY and Text Book of Topographical Surveying in Tropical Africa. By Major F. G. Guggisberg. xii and 246 pp. Maps, illustrations, and index. W. & A. K. Johnston, Ltd., London, 1911. 3s. 6d. 10 x 6½.

UGANDA TO KHARTOUM. Life and Adventure on the Upper Nile. By Albert B. Lloyd. With a preface by Victor Buxton. 319 pp. 57 illustrations and index. Charles Scribner's Sons, New York, 1911. 8 x 5½. [Third Edition of a delightful and informing book reviewed in the *Bulletin* (Vol. 38, 1906, p. 781).]

LA CHINE MODERNE. Par Edmond Rottach. Collection "Les Pays Modernes." Deuxième edition. 270 pp. Map and 20 photographs. Pierre Roger & Cie, Paris, 1911. Fr. 4. 8 x 5½. [An excellent work on the intellectual and industrial transformation now in progress in China, with a survey of the conditions existing before the present revolutionary movement.]

INDIA. Eight Lectures. Prepared for the Visual Instruction Committee of the Colonial Office. By H. J. Mackinder. x and 146 pp. Maps and illustrations. George Philip & Son, Ltd., London, 1910. 8d.

VICTORIAN YEAR-BOOK, 1909-10. By A. M. Laughton, Government Statist. Thirtieth Issue. xxxvi and 732 pp. and maps. J. Kemp, Government Printer, Melbourne, 8½ x 6. [Gives much information of the State of Victoria, its conditions and activities.]

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NEW MAPS

EDITED BY THE ASSISTANT EDITOR

System Followed in Listing Maps.

Title. As on original, if possible. If lacking or incomplete, necessary matter enclosed in brackets.

Scale. Natural (unless otherwise on original), followed by equivalent in miles to one inch. If no scale on original, approximate scale enclosed in brackets.

Coordinates. Approximate limiting coordinates of map given. Where map-net lacking, coordinates, if possible of determination, given in brackets. All meridians referred to Greenwich. If map not oriented N., orientation given.

Colors. Number of tints of separate symbols, not number of color printings given. Black or basal color not considered a color.

Source. If map separately published, name of institution issuing it, place and date given. If a supplement, title of paper or book, author, periodical, volume, number, year and pages given.

Comment. Descriptive and critical. In brackets.

Regional Classification. Major political divisions the unit, as a rule, except for United States and Canada. Boundaries of continents according to Siever's *Länderkunde*, Kleine Ausgabe.

MAPS ISSUED BY UNITED STATES GOVERNMENT BUREAUS

U. S. GEOLOGICAL SURVEY

Geologic Sheets Accompanying Folios of the Geologic Atlas of the United States.

Alabama. Birmingham Quadrangle. Surveyed in 1905-06. 1:125,000 (1 in.=1.97 mile). 34°0′-33°30′ N.; 87°0′-86°30′ W. Edition of April, 1910. (a) Areal Geology. Contour interval 50 ft. 18 colors. (b) Economic Geology. Interval 50 ft. 22 colors. (c) Structure Sections [structural geology with sections]. 16 colors. Accompany "Birmingham Folio (No. 175)" by C. Butts, 1910.

Colorado. Engineer Mountain Quad. Survey completed in 1908. 1:62,500 (1 in.=0.99 mile). 37°45′-37°30′ N.; 108°0′-107°45′ W. Edit. of Sept., 1909. (a) Areal Geology. Interval 100 ft. 22 colors. (b) Structure Sections. 21 colors. Accompany "Engineer Mountain Folio (No. 171)" by W. Cross and A. D. Hole, 1910.

New Jersey-Pennsylvania. Trenton Quad. Surveyed in 1893-1907. 1:125,000. 50°30′-40°0′ N.; 75°0′-74°30′ W. Edit. of March, 1909. (a) Areal Geology. Interval 20 ft. 33 colors. (b) Structure Sections. 31 colors. Accompany "Trenton Folio (No. 167)" by I. Bascom, N. H. Darton, H. B. Kümmel, W. B. Clark, B. L. Miller and R. D. Salisbury, 1909.

New York. Watkins Glen Quad. Surveyed in 1903-05. 1:125,000. 42°30′-42°0′ N.; 77°0-76°30′ W. (a) Areal Geology. Interval 40 ft. 10 colors. Edit. of Feb., 1909. (b) Surficial Geology. Interval 40 ft. 14 colors. Edit. of Dec., 1908.

Catatonk Quad. Surveyed in 1905-06. 1:125,000. 42°30′-42°0′ N.; 76°30′-76°0′ W. (a) Areal Geology. Interval 40 ft. 11 colors. Edit. of Feb., 1909. (b) Surficial Geology. Interval 40 ft. 15 colors. Edit. of Dec., 1908.

Accompany "Watkins Glen-Catatonk Folio (No. 169)" by H. S. Williams, R. S. Tarr and E. M. Kindle, 1909.

North Dakota. Jamestown Quad. Surveyed in 1904-05. 1:125,000. 47°0′-46°30′ N.; 99°0′-98°30′ W. Edit. of March, 1909. (a) Areal Geology. Interval 20 ft. 10 colors. (b) Artesian Water. Interval 20 ft. 5 colors.

Eckelson Quad. Surveyed in 1903-04. 1:125,000. 47°0′-46°30′ N.; 98°30′-98°0′ W. Edit. of April, 1909. (a) Areal Geology. Interval 20 ft. 16 colors. (b) Artesian Water. Interval 20 ft. 5 colors.

Tower Quad. Surveyed in 1903-04. 1:125,000. 47°0′-46°30′ N.; 98°0′-97°30′ W. Edit. of April, 1909. (a) Areal Geology. Interval 20 ft. 18 colors. (b) Artesian Water. Interval 20 ft. 6 colors.

Accompany "Jamestown-Tower Folio (No. 168)" by D. E. Willard, 1909.

Pennsylvania. Johnstown Quad. Surveyed in 1906. 1:62,500. 40°30′-40°15′ N.; 79°0′-78°45′ W. Edit. of May, 1910. (a) Areal Geology. Interval 20 ft. 9 colors. (b) Structure and Economic Geology. Interval 20 ft. 12 colors. Accompany "Johnstown Folio (No. 174)" by W. C. Phalen, 1910.

Pennsylvania. Mercersburg Quad. Surveyed in 1901–07. 1:62,500. 40°0′ - 39°45′ N.; 78°0′ - 77°45′ W. Edit. of April, 1909. (a) Areal Geology. Interval 20 ft. 16 colors. (b) Structure Sections. 17 colors.

Chambersburg Quad. Surveyed in 1901–07. 1:62,500. 40°0′ - 39°45′ N.; 77°45′ - 77°30′ W. Edit. of April, 1909. (a) Areal Geology. Interval 20 ft 17 colors. (b) Structure Sections. 18 colors.

Accompany "Mercersburg-Chambersburg Folio (No. 170)" by G. W. Stose, 1909.

Pennsylvania. Sewickley Quad. Surveyed in 1906–08. 1:62,500. 40°45′ - 40°30′ N.; 80°15′ - 80°0′ W. Edit of Feb., 1910. (a) Areal Geology. Interval 20 ft. 10 colors. (b) Structure and Economic Geology. Interval 20 ft. 12 colors. (c) Oil and Gas. Interval 20 ft. 15 colors. Accompany "Sewickley Folio (No. 176)" by M. J. Munn, 1911.

Pennsylvania-New York. Warren Quad. Surveyed in 1907. 1:62,500. 42°0′ - 41°45′ N.; 79°15′ - 79°0′ W. Edit. of Aug., 1909. (a) Areal Geology. Interval 20 ft. 19 colors. (b) Economic Geology. Interval 20 ft. 8 colors. Accompany "Warren Folio (No. 172)" by C. Butts, 1910.

Wyoming. Laramie Quad. Surveyed in 1905. 1:125,000. 41°30′ - 41°0′ N.; 106°0′ - 105°30′ W. Edit. of Sept., 1909. (a) Areal Geology. Interval 50 ft. 20 colors. (b) Structure Sections. 20 colors. (c) Artesian Water. Interval 50 ft. 10 colors.

Sherman Quad. Surveyed in 1905–08. 1:125,000. 41°30′ - 41°0′ N.; 105°30′ - 105°0′ W. Edit. of Sept., 1909. (a) Areal Geology. Interval 50 ft. 22 colors. (b) Structure Sections. 22 colors.

Accompany "Laramie-Sherman Folio (No. 173)" by N. H. Darton, E. Blackwelder and C. E. Siebenthal, 1910.

Maps Accompanying Publications.

ALABAMA. Map of faulted areas in the Vicinity of Pratt City and Thomas. [1:54,000 (1 in.=0.85 mile)]. [33°32′ N. and 86°60′ W.]. Fig. 8, Birmingham Folio (No. 175), 1910, *Geol. Atlas of the U. S.*

ALASKA. [Ten maps accompanying "Geology and Mineral Resources of Parts of the Alaska Peninsula" by W. W. Atwood. *Bull.* 467, 1911:]

(a) Outline Map of Southwestern Alaska. Showing area under consideration (Pl. VI) and smaller areas included in certain maps in this report. [1:4,700,000 (1 in.=74.2 miles)]. [62° - 54° N.; 166° - 148° W.]. Pl. I.

[Shows routes of recent explorations].

(b) Geologic Reconnaisance Map of the Alaska Peninsula. 1911. From charts 8802 and 8502 of the Coast and Geodetic Survey. Geology compiled in 1909 by W. W. Atwood, based on surveys by W. W. Atwood, H. M. Eakin, G. C. Martin, T. W. Stanton, A. G. Maddren and J. E. Spurr. Mercator's Projection [equatorial scale: 1:1,830,000; mean meridional scale 1:1,000,000 (1 in.=15 8 miles)]. 59°8′ - 54°18′ N.; 165°0′ - 153°10′ W. 15 colors. Pl. VI.

[Valuable general geologic map of the peninsula on a large scale].

(c) Reconnaissance [Topographic] Map of Herendeen Bay and Unga Island Region, Alaska. 1911. Surveyed in 1908 by H. M. Eakin. Contour interval 200 ft. 1:250,000 (1 in.=3.95 miles). 56° - 55° N.; 161°0′ - 160°10′ W. 3 colors Pl. II.

(d) Reconnaissance Geologic Map of the Herendeen Bay and Unga Island Region, Alaska. 1911. Geology by W. W. Atwood, 1908. Same scale and coordinates as map (c). 19 colors. Pl. VIII.

[Geology superimposed on topographic map, Pl. II].

(e) Geologic Reconnaissance Map of Chignik Bay Region. Topography by H. M. Eakin. Geology by W. W. Atwood. Surveyed in 1908. Contour interval 200 ft. 1:250,000. 56°32′ - 56°9′ N.; 159° - 158° W. 13 colors. Pl. VII.

(f) Geologic sketch map of Cape Douglas and vicinity by R. W. Stone. [1:160,000 (1 in.=2.5 miles)]. [58°57′ - 58°43′ N.; 153°35′ - 153°10′ W.]. Fig. 4.

(g) Sketch map of shore features near south entrance to Baralof Harbor, Unga Island. [1:36,000]. (1 in.= 0.57 mile)]. [55°12′ N. and 160°31′ W.] Fig. 11.

(h) Sketch map of shore features near north [south] entrance to Baralof Harbor, Unga Island. [1:36,000]. [55°12′ N. and 160°31′ W.]. Fig. 12.

(i) Sketch map of the shore features near the head of Balboa Bay, which had been selected as a railroad terminus. [1:50,000 (1 in.=0.79 mile)]. [55°36′ N. and 160°36′ W.]. Fig. 16.

(j) Sketch map of a portion of Prospect Bay showing the form of the harbor and the location of copper prospects. [1:40,000 (1 in.=6.3 miles)]. [Near 56½° N. and 158½° W.]. Fig. 18.

COLORADO. (a) Topographic Map of the Southern Portion of the Lake City Quadrangle, Colorado, Showing the approximate locations of patented mining claims. Surveyed in 1903. Contour interval 100 ft. 1911. 1:62.500 (1 in =0.99 mile). 38°5′ - 38°0′ N.; 107°30′ - 107°15′ W. 2 colors.

(b) Geologic Map of the Southern Portion of the Lake City Quadrangle, Colorado. Geologic survey completed in 1009. 1911. 1:62,500. 38°2′30″ - 38°0′0″ N.; 107°30′ - 107°15′ W. 17 colors.

(c) Topographic map of the region around Lake San Cristobal. Contour interval 100 ft. [1 in.= 1 mile (1:63,360)]. [38°0.0′ - 37°57 3′ N.; 107°15.0′ - 107°19.5′ W.].

[S. E. continuation of map (a)].

(d) Index map of a portion of Colorado, showing the location of the mining region discussed in this report. [1 in.=60 miles (1:3,801,600)]. 39 1/5° - 36 4/5° N.; 109⅓ - 105½° W.

Pls. I and II, Figs. 20 and 1, "Geology and Ore Deposits near Lake City, Colorado" by J. D. Irving and H. Bancroft, *Bull.* 478. 1911.

EAST-CENTRAL UNITED STATES. Map of the southern part of the Appalachian province showing its physiographic divisions and its relation to the Coastal Plain. [1:11,000,000 (1 in.=173.6 miles)]. [39°40′ - 32°10′ N.; 88°0′ - 74°30′ W.]. Fig. 2, Birmingham (Ala.) Folio (No. 172), 1910, *Geol. Atlas of the U. S.*

MIDDLE ATLANTIC STATES. Map of the northern part of the Appalachian province, showing its physiographic divisions and its relation to the Coastal Plain province. [1:7,800,000 (1 in.=123.1 miles)]. [42°20′ - 37°0′ N.; 83°40′ - 73°30′ W.]. Fig. 2, Warren Folio (No. 172), 1910, Johnstown Folio (No. 174), 1910, and Sewickley Folio No. 176, 1911, *Geol. Atlas of the U. S.*

NORTH AND SOUTH DAKOTA, ETC. Sketch map showing the southern limit of the Pleistocene ice sheet and the distribution of moraines of the Dakota glacial lobe in North and South Dakota. Compiled largely from maps by J. E. Todd, Warren Uphham and the author [D. E. Willard]. [1:3,400,000 (1 in.=53.7 miles)]. [47°40′ - 40°30′ N.; 101°0′ - 96°20′ W.]. Fig. 2, Jamestown-Tower Folio (No. 168), 1909, *Geol. Atlas of the U. S.*

NORTH DAKOTA. Sketch map of the Jamestown, Eckelson and Tower quadrangles, showing depth to base of till. [1:650,000 (1 in.=102.3 miles)]. [47°0′-46°30′ N.; 99°0′-97°30′ W.]. Fig. 5, Jamestown-Tower Folio (No. 168), 1909, *Geol. Atlas of the U. S.*

PENNSYLVANIA. Structure of the rocks of the Warren quadrangle shown by contours on the top of the Salamanca conglomerate member which represent the approximate elevation of this member above sea. [1:190,000 (1 in.=30.0 miles)]. [42°0′-41°45′ N.; 79°15′-79°0′ W.]. Fig. 14, Warren Folio (No. 172), 1910, *Geol. Atlas of the U. S.*

PENNSYLVANIA. (a) Convergence map showing by lines of equal distance the vertical distance between the Ames limestone member and the Hundred-foot sand in the Sewickley quadrangle. [1:190,000 (1 in.=30.0 miles)]. [40°45′-40°30′ N.; 80°15′-80°0′ W.].

(b) Axes of folds in the Ames limestone member and the Hundred-foot sand in the Sewickley quadrangle. Same scale and coordinates as map (a).

Figs. 5 and 6, Sewickley Folio (No. 176), 1911, *Geol. Atlas of the U. S.*

PENNSYLVANIA-MARYLAND. Relief Map of Cumberland Valley, the Appalachian valley ridges, and South Mountain in southern Pennsylvania. 1 in.=10 miles (1:633,600). [40°21′-39°38′ N.; 78°8′-76°50′ W.]. Fig. 2, Mercersburg-Chambersburg Folio (No. 170), 1909, *Geol. Atlas of the U. S.* [Photograph of a relief model].

PENNSYLVANIA-NEW YORK (a) Sketch map of the Watkins Glen and part of the Catatonk quadrangles and adjacent portion of Pennsylvania, showing location of anticlinal and synclinal axes. [1 in.=22 miles (1:1,393,920)]. 43°30′-41°30′ N.; 78°0′-76°15′ W.

(b) Sketch map of western New York, showing distribution of morainal deposits and direction of ice movement. From maps of Chamberlin, Leverett, Fairchild and Tarr. [1:3,600,000 (1 in.=56.8 miles)]. [43°45′-41°30′ N.; 79°50′-75°5′ W.].

(c) Sketch map of glacial Lake Newberry in west-central New York. After H. L. Fairchild. [1:2,000,000 (1 in.=31.6 miles)]. [43°45′-41°55′ N.; 78°20′-75°40′ W.].

Figs. 10, 11 and 13, Watkins Glen-Catatonk Folio (No. 169), 1909, *Geol. Atlas of the U. S.*

PENNSYLVANIA-NEW YORK, ETC. Map showing the distribution of the glacial deposits of Pennsylvania and adjoining portion of New York. Compiled by Wm. C. Alden, 1901. 1 in.=approx. 40 miles (1:2,500,000). [42°15′-40°25′ N.; 80°15′-74°45′ W.]. Fig. 12, Warren Folio (No. 172), 1910, *Geol. Atlas of the U. S.*

PENNSYLVANIA–OHIO–NEW YORK, ETC. Sketch map showing the probable preglacial drainage of western Pennsylvania. (After Leverett, with slight changes). [1:3,000,000 (1 in.=47.3 miles)]. [42°35′-39°30′ W.; 81°10′-78°0′ W.]. Fig. 16, Warren Folio (No. 172), 1910, and Fig; 3, Sewickley Folio (No. 176), 1911, *Geol. Atlas of the U. S.*

WYOMING. Structure of the Laramie quadrangle shown by contours on the top of the Casper formation representing elevations above sea. [1:390,000 (1 in.=6.2 miles)]. [41°30′-41°0′ N.; 106°0′-105°30′ W.]. Fig. 3, Laramie-Sherman Folio (No. 173), 1910, *Geol. Atlas of the U. S.*

BUREAU OF THE CENSUS

WASHINGTON. [Four cartograms entitled:] (1) Per Cent. of Increase or Decrease of Population of Washington, by Counties: 1900–1910. (a) Total Population. (b) Rural Population. (2) Density of Population of Washington by Counties: 1910. (a) Total Population. (b) Rural Population. [1:4,400,000 (1 in.=69.4 miles)]. Accompany, on pp. 5 and 6, "Population, Washington." *Bull. Thirteenth Census of the United States: 1910*, [1913].

NORTH AMERICA

NORTH AMERICA. Geologic Map of North America Compiled by the United States Geological Survey in Cooperation with the Geological Survey of Canada and Instituto Geologico de Mexico under the Supervision of Bailey Willis and George W. Stose. Geologic drafting by Henry S. Selden. 1, 11. 4 sheets. 1:5,000,000 (1 in.=78.91 miles). 85°-5° N.; 180°-12° W. 42 colors. With two insets on same scale: (1) Aleutian Islands. 53°-50° N.; 188° [sic]-163° W. (2) Windward Islands. 19°-8° N.; 67°-59° W. Pl. I, "Index to the Stratigraphy of North America" by Bailey Willis, *Prof. Paper*. 71, 1912. (Also sold separately for 75 cents.)

[For detailed review of this standard map, which is the second edition of the one published on the occasion of the Tenth International Geological Congress at Mexico, 1906, see *Bull.*, Vol. 44, No. 1, 1912, pp. 40–44].

UNITED STATES

UNITED STATES. Gray's New Railway System Map of the United States, Dom. of Canada and Mexico. Compiled from Latest Official Sources, showing carefully selected lists of Cities & Towns in readable type for quick reference. C. P. Gray, Map Maker, 130 Fulton Street, New York. 4 sheets. [1:2,750,000 (1 in.=43 4 miles)]. 55°-24° N.; 129°-63° E. 35 colors.

An excellent large-scale general map distinguishing the railroad systems of the United States by separate colors. The map is a good example of efficiency in the use of color symbols. Although relatively few colors are used, upwards of 100 railroad systems are so clearly delineated as not to allow of a moment's doubt as to the identity of any line. This is attained by judicious use of differentiated symbols (full, broken, dotted lines, etc. in different colors) and by avoiding the use of the same color symbol to denote contiguous or overlapping systems. An index allows of the location by rectangular coordinates of 02 railroad systems.

For an equally successful treatment of the railroad systems of Great Britain and Ireland, see Harmsworth's Atlas (Geo. Philip & Son, London) Pls. 21–22, 23–24, 30, 37–38].

CANADA

NORTHWEST TERRITORIES. (a) Plan of Churchill Harbour. By Lieut. A. R. Gordon, R.N. Asstd. by J. W. Tyrrell, P.L.S. 1 in.=2,000 ft. (1:24,000). 58°45′ N. and 94°10′ W. 2 colors.

(b) Chart of York Roads. By Lieut. A. R. Gordon, R.N. Asst. by J. W. Tyrrell, P.L.S. 1 in.=12,000 ft. (1:144,000). 92°30′ W. and 57°0′ N. 3 colors.

Accompany, following p. 334, "Report on the Dominion of Canada Government Expedition to the Arctic Islands and Hudson Strait on board the D.G.S. *Arctic*" by J. E. Bernier, Ottawa, 1910.

CENTRAL AMERICA AND WEST INDIES

GREATER ANTILLES. Map of the Isle of Pines. [1:800,000 (1 in.=12.6 miles)]. 22°0′ - 21°25′ N.; 83°15′ - 82°35′ W.]. Accompanies "A Caribbean Island" by J. Fortescue, *Bull. Pan Amer. Union*, Vol. 33, No. 4, 1911, pp. 706–721.

SOUTH AMERICA

BOLIVIA. Position of the River Heath. [1:8,000,000 (1 in.=126.3 miles)]. 9° - 17° S.; 72° - 64° W. Accompanies "The River Heath." *Bull. Pan Amer. Union*, Vol. 33, No. 4, 1911, pp. 769–766.

[Cf. map facing p. 436, *Bull.*, Vol. 42, No. 6, 1910, and map listed under "Bolivia," *Bull.*, Vol. 43, No. 5, 1911, p. 391].

CHILE. [Mapa de Chile. Ejecutado por órden de S. E. el Presidente de la República, Exmo. Sr. D. Pedro Montt. Officina de Mensura de Tierras. Edicion Centenaria. 1910. (Maps *c–g*, 1911)]. 1:500,000 (1 in.=7.89 miles). 5 colors. Sheets (no individual title): (a) 47° - 49° S.; 76°0′ - 70°50′ W. (b) 49° - 51° S.; 76°0′ - 70°50′ W. (c) 51° - 53° S.; 76°0′ - 70°50′ W. (d) 51° - 53° S.; 71°0′ - 65°30′ W. (e) 53° - 55° S.; 76°0′ - 70°50′ W. (f) 53° - 55° S.; 71° - 65°30′ W. (g) 55° - 57° S.; 71° -65°30′ W.

[Official map of Chile on relatively large scale. Above sheets embrace Territorio de Magallanes. Statistics of the Territory on map (d). Index of place-names on reverse of each sheet. The complete map consists of 22 sheets, each occupying two degrees of latitude. Some of the other sheets listed in *Bull.*, Vol. 41, No. 9, 1909, p. 600, and Vol. 43, No. 5, 1911, p. 391].

CHILE-ARGENTINA. Track Chart of the Straits of Magellan. [1:3,200,000 (1 in.=50.5 miles)]. 52°20′ - 54°30′ S.; 75°10′ - 68°0′ W. 1 color. Accompanies, facing p. 146, Vol. I, "The Andean Land" by C. S. Osborn, Chicago, 1909.

FALKLAND ISLANDS. [Map of] Falkland Islands. [1:2,300,000 (1 in.=36.3 miles)]. 52° - 52½° S.; 62° - 57° W. 1 color. Accompanies, facing p. 110, Vol. I, "The Andean Land," by C. S. Osborn, Chicago, 1909.

AFRICA

BELGIAN CONGO. The Itimbiri River and Country between the Welle and Aruwimi Rivers. From prismatic compass traverses and astronomical observations by Messrs. C. A., A. E. H. and R. L. Reid. 1:750,000, or 1 in.=11.84 miles. 3°45′ - 1°50′ N.; 22°25′ - 26°50′ E. 2 colors. With list of geodetic positions and inset showing general location of main map, 1:15,000,000 (1 in.=236.74 miles). Accompanies "Messrs. C. A. and A. E. H. Reid's Surveys in the Northern Congo Basin," *Geogr. Journ.*, Vol. 38, No. 6, 1911, pp. 591–592.

[Cf. also map of Aruwimi R. by R. L. Reid, listed in *Bull.*, Vol. 43, No. 10, 1911, p. 797].

BELGIAN CONGO. (a) Léopoldville en 1889. [1:7,000 (1 in.=0.11 mile)]. 4¼° S. and 15½° E. With inset: Stanley Pool. 1:700,000 (1 in.=11.05 miles). (b.) Léopoldville en 1910. No scale. Pls. IV and V, "Les villes du Congo: Léopoldville" by Mahieu, *Revue Congolaise*, Vol. 2, No. 2, 1911, pp. 125–140.

BRITISH AND GERMAN EAST AFRICA. Mombasa-Victoria (Uganda) Railway. 1:1,584,000, or 1 in.=25 miles. 0°45′ N. - 4°45′ S.; 31° - 31°0′ - 40°30′ E. 2 colors. Intelligence Division, War Office. April, 1909.

[Shows stations on Uganda Railway and steamer routes on Victoria Nyanza].

CAPE OF GOOD HOPE. Sketch showing the position of Le Vaillant's Grotto [31°57′ S. and 18°34′ E.]. 1:1,000,000, or 1 in.=15.78 miles. 31°22′ - 32°25′ S.; 17°48′ - 18°55′ E. Accompanies "Le Vaillant's Grotto at Heerenlogement" by H. H. W. Pearson, *Geogr. Journ.*, Vol. 39, No. 1, 1912, pp. 40–47.

ERITREA. Carta dimostrativa della Colonia Eritrea e delle Regioni Adiacenti alla scala di 1:400,000 (1 in.=6.31 miles). 5 colors. Instituto Geografico Militare, Rome, 1909 and 1910. 14 sheets. F[oglio] 1: Basso Barca. 18° - 16° N.; 36° - 38° E. F.2: Nacfa. 18° - 16° N.; 38° - 40° E. F 3: Isole Farisan. 18° - 16° N.; 40° - 42° E. F.4: Abù Arisc'. 18° - 16° N.; 42° - 44° E. F.5: Agordat. 16° - 14° N.; 36° - 38° E. F.6: Asmara. 16° - 14° N.; 38° - 40° E. F.7: Baia d'Amfilè. 16° - 14° N.; 40° - 42° E. F.8: Hodèida. 16° - 14° N.; 42° - 44° E. F.9: Gondar. 14° - 12° N.; 36° - 38 E. F.10: Macallè. 14° - 12° N.; 38° - 40° E. F.11: Edd. 14° - 12° N.; 40° - 42° E. F11bis: Hadelè Gubò. 12° - 11° N.; 40° - 42° E. F.12: Assab. 14° - 12°N.; 42° - 44 E. F.12 bis: Gibuti. 12° - 11° N.; 42° - 44° E.

[Valuable official map of the Colony of Eritrea on a relatively large scale. Drainage in blue, relief in brown hachures, vegetation in green, roads and tribal names in red. Sources given on each sheet. Title on Foglio 4. Index map listed under Europe, "Italy and Colonies," (g)].

ERITREA. [Index maps of Maps of Eritrea 1:50.000, 1:100,000, 1:400,000. See under Europe, "Italy and Colonies," (e), (f), (g).].

ITALIAN SOMALILAND. [Index map of Map of Italian Somaliland, 1:200,000. See under Europe, "Italy and Colonies," (h)].

KAMERUN, ETC. La Route de la Bénoué au Tchad. [1:13,000,000 (1 in.=208.0 miles)]. [13° N. - 1½° S.; 8½° - 21° E.]. With two insets: (1) Du Mayo-Kebbi au Logone (in two parts). [1:700,000 (1 in.=11.0 miles)]. [10°0′ - 9°40′ N.; 13°50′ - 16°0′ E.]. (2) [Map of west-central Africa for comparison. 1:50,000,000]. Accompanies "La Voie de la Bénoué" by Capt. Mercier, *Renseign. Colon.*, 1911, No. 11, pp. 276–285.

[Inset (1) a detailed map of the French route of access to the Chad Territory through Kamerun].

KAMERUN-FRENCH CONGO, ETC. Das Kamerun-Kongo-Abkommen zwischen dem Deutschen Reich und Frankreich vom 4. November 1911. 1:5,000,000 (1 in.=78.91 miles). 14°30′ N. - 6°40′ S.; 4°40′ - 20°30′ E. 11 colors. With two insets: (1) Der deutsche Kongozipfel. 1:2,000,000 (1 in.=31.56 miles). 0° - 1°30′ S.; 16°25′ - 18°0′ E. 5 colors. (2) Süd-deutschland im Massstab der Hauptkarte. 1 color. Taf. 43, "Das deutsch-französiche Kamerun-Kongo-Abkommen vom 4. November 1911" by H. Wichmann, *Pet. Mitt.*, Vol. 57, II, Dec., 1911, pp. 332–333.

[In content and execution the best current presentation of this subject-matter. An example of the ready facilities of the Perthes geographical establishment to meet any cartographic demand of the moment.

The map, which is a photo-lithographic enlargement of the corresponding sheet in Stieler's

Hand-Atlas, shows the boundaries of the territorial changes, the "concessions" allotted to the various exploiting companies, with their name, the French telegraph line from the Ubangi to Loango, French routes of access through foreign territory and the limit of the Free Trade Zone of the Congo Basin, according to the Berlin Conference of 1885. Inset (1) shows the German access to the Congo].

KAMERUN-FRENCH CONGO, ETC. (a) L'Afrique Equatoriale d'après l'accord Franco-Allemand. 1:10,000,000 (1 in.=157.83 miles). 15° - 6° S.; 6° - 20½° E.

[In content practically as complete as Taf. 43, *Pet. Mitt.*, listed above; in some respects more legible because with critical nomenclature].

(b) Détail de la Frontière sur la Sangha. 1:1,500,000 (1 in.=23.67 miles). [2°20′ - 1°10′ N.; 15°30′ - 16°30′ E.].

(c) Détail de la Frontière sur le Congo. 1:1,500,000. [0°20′ - 0°40′ S.; 16°30′ - 17°40′ E.].

(d) Détail de la Frontière sur l'Oubangui. 1:1,500,000. [4°20′ - 3°10′ N.; 18°0′ - 18°40′ E.].

Accompany "Accord franco-allemand du 4 novembre 1911 relatif au Congo" [text], *l'Afrique Franç.*, Vol. 21, No. 11, 1911, pp. 413–415.

[Maps (b), (c) and (d) valuable detailed maps of the critical districts involved in the agreement; typical of the valuable material, mostly original, embodied in the maps of *l'Afrique Française*].

KAMERUN-FRENCH CONGO, ETC. La "Coupure" Projetée en Septembre 1911. (Extrait du *Temps* du 16 septembre). [Original German demands for cession of territory in French Congo]. [1:25,000,000 (1 in.=394.6 miles)]. [13½° N. - 6° S.; 8° - 26° E.]. Accompanies comment on Franco-German agreement of Nov. 4, 1911, by A. Terrier, *l'Afrique Franç.*, Vol. 21, No. 11, 1911, pp. 417–419.

KAMERUN-FRENCH CONGO, ETC. Sketch Map showing Cessions of Territory in Equatorial Africa provided for by the Franco-German Treaty of November, 1911. 1:12,000,000, or 1 in.=189.39 miles. 14¾° N. - 6¼° S.; 7¾° - 20° E. Accompanies "Franco-German Territorial Arrangement," *Geogr. Journ.*, Vol. 38, No. 6, 1911, pp. 622–624.

KAMERUN-FRENCH CONGO, ETC. The Franco-German Congo Agreement. [1:12,500,000 (1 in.=197.3 miles)]. 14° N. - 7° S.; 6 2/5° - 20° E. With two insets on same scale: (1) Togo, Dahomey, etc. [11° - 5½° N.; ½° W. - 3½° E.] (2) Scotland for comparison. Accompanies note with same title, *Scott. Geogr. Mag.*, Vol. 27, No. 12, 1911, p. 659.

[This map, on inset (1), incorrectly indicates the cession to France, on the part of Germany, of a strip of territory lying east of the Upper Mono R. in Togo. Although this cession was broached during the negotiations in September it was not incorporated into the final agreement of Nov. 4, 1911. Cf. *l'Afrique Franç.*, Vol. 21, No. 11, 1911, p. 417].

MOROCCO. (a) Das Bergland westlich von Fas [Fez]. Entworfen und gezeichnet von Prof. Dr. P. Schnell. (P. Schnell: Zur Kartographie von Nordmarokko. Blatt I.). 1:200,000 (1 in.=3.16 miles). 34°23′ - 33°42′ N.; 6°2′ - 40°58′ W. 4 colors.

(b) Übersichtskarte der Peilungen zu Blatt 1: Das Bergland westlich von Fas. (Zur Kartographie Nordmarokkos). Von Prof. Dr. Paul Schnell. 1:300,000 (1 in.=4.73 miles). [35°5′ - 33°48′ N.; 6°5′ - 40°57′ W.].

Taf. 30, "Zur Kartographie Nordmarokkos" by P. Schnell, *Pet. Mitt.*, Vol. 57, II, Nov., 1911, pp. 257–261, and Taf. 42, Vol. 57, II, Dec., 1911.

[Map (a) an exhaustive critical compilation of all available material. Relief in approximate contours and shading in brown, drainage in blue, vegetation and agriculture (six symbols) in green, explorers' routes, thirty in number, in red. Map (b) shows the azimuth traverses on which map (a) is based].

MOROCCO, RIO DE ORO, ETC. Les zones d'influence de l'Espagne au Maroc d'après le traité de 1904. [1:11,800,000 (1 in.=186.2 miles)]. 37° - 19¾° N.; 18° - 1¾° W. Accompanies "Les accords franco-espagnols" by A. Terrier, *l'Afrique Franç.*, Vol. 21, No. 11, 1911, pp. 446–452.

MOROCCO. Zone d'Influence Espagnols du Projet de 1902. (Carte du *Figaro*). [1:3,800,000 (1 in.=60.0 miles)]. 36°10′ - 33°20′ N.; 7°40′ - 1°20° W. Accompanies "Les accords franco-espagnols" by A. Terrier, *l'Afrique Franç.*, Vol. 21, No. 11, 1911, pp. 446–452.

RHODESIA—NYASALAND—PORTUGUESE EAST AFRICA, ETC. Map to illustrate the paper by Sir Alfred Sharpe, K.C.M.G., C.D., L.L.D., on British Central Africa. 1:5,000,000, or 1 in.=78.91 miles. 6° - 20° S.; 27° - 41° E. 3 colors. Accompanies "The Geography and Economic Development of British Central Africa" by A. Sharpe, *Geogr. Journ.*, Vol. 39, No. 1, 1912, pp. 1–22.

[Valuable compilation based on route and boundary surveys, Admiralty charts, new official maps of Southern Rhodesia and Nyasaland and Beringer's Map of North-Eastern Rhodesia].

WESTERN AFRICA. (a) Itinéraire du voyageur [from Algiers to Gâo on the Niger]. [1:40,000,000 (1 in.=631.3 miles)]. [35° - 3° N.; 20° W. - 10° E.].

(b) Carte des chemins de fer de l'Afrique Occidentale Française. [1:26,000,000 (1 in.=410.4 miles)]. [19° - 2° N.; 20° W. - 9° E.].

Accompany, on pp. 11 and 263, "Notre Beau Niger" by F. Dubois, Paris, 1911.

ASIA

ASIA. Map Illustrating Russian Advance in Asia. 1 in.=331 miles (1:19,872,160). With inset of west-central Asia showing the advance of Russia's Asiatic boundary. [1:21,800,000]. 56° - 33° N.; 35° - 93° E. Accompanies, facing p. 188, "Afghanistan: The Buffer State" by G. Lyons, London, 1910.

BOKHARA. Map of the Emirate of Bokhara. On the basis of the Russian 40-verst map with additions by O. Olufsen. [1:1,700,000 (1 in.=26.8 miles)]. 42½° - 36½° N.; 59° - 73° E. 2 colors. Accompanies "The Emir of Bokhara and his Country" by O. Olufsen, London, 1911.

[Valuable because of its relatively large scale. Mountains in brown shading; symbol for desert; principal roads shown].

CELEBES. Central Celebes Showing the Explorations of E. C. Abendanon, 1909–10. 1:3,000,000, or 1 in.=47.34 miles. 0°20′ N. - 4°25′ S.; 119°10′ - 121°55′ E. Accompanies "Central Celebes," *Geogr. Journ.*, Vol. 38, 1911, No. 6, pp. 594–598.

[Based on map published in *Tijds. Kon. Nederl. Aardr. Genoot.* Cf. *Bull.*, Vol. 43, No. 7, 1911, p. 549].

XUM

CEYLON. [Map of] Ceylon. 12 miles to an inch (1:760,320). 10°0′ - 6°10′ N.; 79°15′ - 82°0′ E. 7 colors. Survey Dept., Colombo, 1910].

[Standard official general map of Ceylon. Political divisions shown by areal coloring].

CHINA. (1) Itinéraire de Yun-nan-fou à Sin-pou-tse, sur le Yang-tseu, levé par le Dr. Legendre. 1:1,500,000 (1 in = 23.67 miles). [26°20′ - 25°0′ N.; 101°10′ - 102°40′ E.].

(2) Itinéraire de Vae-si-hien à Fou-lin (Yun-nan), levé par le Dr. Legendre. 1:1,500,000. [29°25′ - 28°40′ N.; 102°40′ - 103°15′ E.]. With inset showing location of maps (1) and (2).

Figs. 23 and 24, "Exploration dans le Yun-nan et dans le Sseu-tch'ouan" by A. F. Legendre, *La Géogr.*, Vol. 24, No. 4, 1911, pp. 225–232.

DUTCH EAST INDIES. (a) [Sixteen maps entitled:] Barrière-Riffen en Atollen in den Oost-Indischen Archipel. Samengesteld tot toelichting van het artikel van Prof. J. F. Niermeyer door C. Craandijk. 1 color. 1. Westkust Sumatra. 1:500,000 (1 in.=7.89 miles). 0°30′ S. and 100°0′ E. 2. Zuid-ingang Straat Makasser. 1:1,000,000 (1 in.=15.78 miles). 5° S. and 117° E. 3. Oostkust Borneo. 1:500,000. 1°30′ N. and 119° E. 4. Noordkust Golf van Tomini. 1:500,000. 0°30′ N. from 120 3/5° to 122 2/5° E. 5. Straat Makasser. Borneo-bank. 1:1,000,000. 2° S. and 118° E. 6. Golf van Tomini. 1:200,000 (1 in.=3.16 miles). 0°50′ S. and 120°20′ E. 7. Golf van Tomini. Togian-eilanden. 1:200,000. 0°20′ S. and 121°40′ E. 8. Westkust Celebes. 1:1,000,000. 5° S. and 119° E. 9. Golf van Tomini. Togian-eilanden. 1:200,000. 0°30′ S. and 122°10′ E. 10. Noord- en Oostkust eiland Wangi Wangi. 1:100,000. 5°18′ S. and 123°36′ E. 11. Oostkust Celebes. 1:500,000. 2° S. and 122° E. 12. Noordkust Flores. 1:500,000. 8°30′ S. and 121°30′ E. 13. Oostkust Borneo. Moearas-rif. 1:400,000. 1°50′ N. and 118°55′ E. 14. Mapia-eilanden. 1:200,000. 0°55′ N and 134°18′ E. 15. O kust Borneo. Eiland Maratoea. 1:400,000 (1 in.=6.31 miles). 2°15′ N. and 118°35′ E. 16. Angelika-droogte. 1:100,000 7°46′ S. and 122°18′ E.

(b) Atolvormige Riffen (Vervolg van Krt. XIII). 17. Sermata-eilanden. Meatij Miarang-rif. 1:250,000 (1 in = 3.95 miles). 8°22′ S. and 128°30′ E. 18. Rif "de Bril." 1:200,000. 6°4′ S. and 118°55′ E. 19. Noordkust Flores Gosong Boni. 1:200,000. 8°23′ S and 122°14′ E. 20. Rif in de Golf van Tomini. 1:200,000. 0°24′ N and 120°32′ E. 21. Golf van Tomini. Lalanga-rif. 1:200,000. 1°2′ S. and 120°40′ E. 22. Noordkust Java. Riffen nabij Boompjes-eiland. 1:200,000. 5°50′ S. and 108°20′ E.

Overzichtskaartje aangevende Barrière Riffen en Atollen nabij. Celebes en de Kleine Soenda-eilanden. 1:6,500,000 (1 in.=102.58 miles). 2½° N. - 11° S.; 114½° - 125½° E.

[Valuable general map showing barrier reefs and atolls. Indicates by number location of reefs shown on large-scale maps 1–22].

Kaart No XIII and XIV, "Barrière-Riffen en Atollen in de Oost-Indiese Archipel" by J. F. Niermeyer, *Tijds. kon. Nederl. Aardr. Genoot.*, Vol. 28, No. 6, 1911, pp. 877–894.

INDIA. [Map of India showing the route of the German Crownprince, Nov. 1910–Feb. 1911, and of Dr. Wegener in 1898, 1906 and 1910–1911]. 1:20,000,000 (1 in.=315.65 miles). [38° - 5° N.; 62° - 102° E.]. Taf 6, "Das heutige Indien . . ." (first part) by G. Wegener, *Ztschr. Gesell. Erdk. Berlin*, 1911, No. 8, pp. 521–452.

JAVA. Sedoelang-eilanden (Noordkust van Java) in 1884. 1,200,000 (1 in.=3.16 miles). 6°6′ - 6°15′ S.; 107°30′ - 107°41′ E. Accompanies "Het dalen van de Sedoeleng-eilanden op de Noordkust van Java" by C. Craandijk, *Tijds. kon. Nederl. Aardr. Genoot.*, Vol. 28, No. 6, 1911, pp. 927–928.

KOREA. [Map of] Korea. 1:4,080,000, or 1 in.=64.39 miles. 43° - 33° N.; 124° - 131½° E. 2 colors. Accompanies "The Story of Korea" by J. H. Longford, New York, 1911.

THE NEARER EAST. Map illustrating Russian Advance in Central Asia. [1 in.=128 miles (1:8,110,080)]. 42° - 23° N.; 43° - 79° E. Accompanies, facing p. 52, "Afghanistan: The Buffer State" by G. Lyons, London, 1910.

AUSTRALASIA AND OCEANIA

DUTCH NEW GUINEA. Schets van den loop der Idenburg-rivier. 1:1,000,000 (1 in.=15.78 miles). [20°45′ - 3°55′ S.; 138°10′ - 139°45′ E.]. Accompanies "De Idenburg-Rivier." *Tijds. kon. Nederl. Aardr. Genoot.*, Vol. 28, 1911, No. 6, pp. 962–964.

[Map of the Mamberamo R., of which the Idenburg is a right affluent, listed in *Bull.*, Vol. 43, No. 7, 1911, p. 550].

NEW GUINEA. Loop der Keizerin Augusta-rivier (Nieuw-Guinea) bij de grens van het Ned. gebied. 1:1,000,000 (1 in = 15.78 miles). [4° - 5° S.; 140° - 141½° E.]. Accompanies ". . . uit het Jaarsverslag van den Topographischen Dienst in Ned. Indië over 1910" by J. J. S., *Tijds. kon. Nederl. Aardr. Genoot.*, Vol. 28, No. 6, 1911, pp. 954–962.

[Map of the head of the Kaiserin Augusta R. Detailed map of lower course listed under German New Guinea in *Bull.*, Vol. 43, No. 5, 1911, p. 392].

VICTORIA. (a) Victoria classified according to its productiveness. 16 miles to 1 inch (1:1,013,760). 33 4/5° - 39° S.; 140¾° - 150¼° E. 5 colors. Crown Lands Dept., Melbourne. Aug. 1907. 2/6.

[Distinguishes between land adapted to wheat growing, grazing land, agricultural land, land adapted to fruit growing, and forest and timber reserves].

(b) Victoria Showing Positions of Butter Factories (creameries not indicated). Same scale and coordinates as map (a). 1 color. Jan., 1907. On reverse of map (a).

EUROPE

FRANCE. Carte aéronautique. 1:200,000 (1 in.=3.16 miles). 5 colors. Sheets: (1) Amiens. 50°13′ - 49°28′ N.; 1°53′ - 3°40′ E. (2) Châlons. 49°28′ - 48°46′ N.; 3°40′ - 5°24′ E. (3) Mézières. 50°12′ - 49°29′ N.; 3°40′ - 5°28′ E. (4) Paris. 49°29′ - 48°46′ N.; 1°54′ - 3°40′ E. Service Géographique de l'Armée. 1 50 frs. a sheet.

[Sheet Châlons previously listed in *Bull.*, Vol. 43, No. 11, 1911, p. 878. Limiting coordinates approximate only. They do not coincide with margin of each sheet, as the projection used is drawn for the whole map and not for each sheet as a unit. Decimal system of angular measure used].

GERMANY. (a) Skizze der Entwicklung des Darss. 1:200,000 (1 in.=3.16 miles). [54°25 N. and 12°30′E].

XUM

(b) Skizze der älteren und jüngeren Dünengenerationen der Kurischen Nehrung bei Schwarzort, zum Teil nach eigenen Aufnahmen. 1:50,000 (1 in.=0.79 mile). [55°32′ N. and 21°10′ E.].

Figs. 44 and 52, "Einige Ergebnisse entwicklungsgeschichtlicher Studien an europäischen Flachlandsküsten und ihren Dünen" by G. Braun, *Ztschr. Gesell. Erdk. Berlin*, 1911, No. 8, pp. 543–560.

ITALY AND COLONIES. [Fourteen index maps of Italian government maps:] (a) Quadro d'Unione dei Fogli della Carta d'Italia [I] alla scala di 1:100,000, [II] divisi per quadranti alla scala di 1:50,000, e [III] per tavolette alla scala di 1:25,000. 1:1,500,000 (1 in.=23.67 miles): (1) I. Sezione [western northern Italy]. (2) II. Sezione [eastern northern Italy]. (3) III. Sezione [north-central Italy]. (4) IV. Sezione [south-central Italy]. (5) V. Sezione [Sardinia]. (6) VI. Sezione [southern Italy] (7) VII. Sezione [sicily].

(b) Quadro d'Unione della Granda Carta Topografica del Regno d'Italia alla scala di 1:100,000. Edizione (A) in nero a tratteggio, (B) policroma a sfumo, (C_1) in nero senza tratteggio, (C_2) policr. senza sfumo. [1:6,000,000 (1 in.=94.7 miles)].

(c) Quadro d'Unione della Carta Corografica d'Italia alla scala di 1:200,000. [1:8,000,000 (1 in.=126.3 miles)].

(d) Quadro d'Unione della Carta Corografica del Regno d'Italia e delle Regioni Adiacenti alla scala di 1:500,000. [1:10,600,000 (1 in.=167.3 miles)].

(e) Quadro d'Unione della Carta Topografica della Colonia Eritrea alla scala di 1:50,000. [No geographic outline; limits of sheets only]. (f) Quadro d'Unione della Carta Topografica della Colonia Eritrea alla scala di 1:100,000. [1:1,000,000 (1 in.=15.8 miles)]. [16°0′ - 14°20′ N.; 37°40′ - 40°20′ E.]. (g) Quadro d'Unione della Carta Dimostrativa della Colonia Eritrea e delle Regione Adiacenti alla scala di 1:400,000 [1:8,000,000]. [18° - 11° N.; 36° - 44° E.].

(h) Quadro d'Unione della Carta Dimostrativa della Somalia Italiana alla scala di 1:200,000. [1:6,300,000 (1 in.=99.4 miles)]. 5°20′ N. - 0°40′ S.; 42° - 49° E.

Taf. 33 (I–VII)–38, "Die moderne Kartographie des Königreichs Italien und seiner Kolonien" by A. Mori, *Pet. Mitt.*, Vol. 57, II, Nov., 1911, pp. 277–280.

THE NETHERLANDS. Duinen tusschen Scheveningen en Katwijk. 1:100,000 (1 in.=1.58 miles.) [52°10′ N. and 4°20′ E.]. Accompanies "Over den Vorm van het Grondwatervlak in het Duin" by E. Dubois, *Tijds. kon. Nederl. Aardr. Genoot.*, Vol. 28, No. 6, 1911, pp. 895–902.

[Gives the names of the sand dunes between the two places mentioned].

RUSSIA. Militärgeographische Skizze des Polesie (West-Russland). Entworfen von Hauptmann G. Kuchinka. 1:1,500,000 (1 in.=23.67 miles). 54°15′ - 50°0′ N.; 23°0′ - 31°30′ E. 4 colors. Taf. 40, "Das Polesie im westlichen Russland" (conclusion) by G. Kuchinka, *Pet. Mitt.*, Vol. 57, Nov., 1911, pp. 296–298.

SCOTLAND. (a) [Four] Maps of Edinburgh District. (Sheet 32 of Ordnance Survey). 1:126,720= 2 miles to an inch. 56°2′ - 55°48′ N.; 3°36′ - 2°59′ W. (1) Topography. 14 colors. (2) Geology. 18 colors. (3) Hydrography. 3 colors. (4) Distribution of Population According to Buildings. 3 colors.

(b) The Esk near Polton. [1:20,000 (1 in.=0.32 mile)]. [56°52.0′ N. and 3°8.4′ W.].

(c) Map showing the Borthwick dry valley. [1:42,000 (1 in.=0.66 mile)]. [55°51.4′ - 55°48.0′ N.; 3°3.0′ - 3°59.0′ W.].

(d) Mean Annual Rainfall [of Edinburgh District]. [1:480,000 (1 in.=7.8 miles)]. Same coordinates as maps listed under (a).

(e) Map showing density of population and number of inhabitants in each parish [Edinburgh District], 1911. Same scale and coordinates as map (d).

Accompany "Notes on the Geography of the Edinburgh District" by J. Cossar, *Scott. Geogr. Mag.*: maps (a), (b) and (c), as separate plate and Figs. 8 and 11, first part, Vol. 27, No. 11, 1911, pp. 574–600; map (d), second part, Vol. 27, No. 12, 1911, pp. 643–654; map (e), conclusion, Vol. 28, No. 1, 1912, pp. 10–30.

POLAR.

ANTARCTIC REGIONS. South Georgia: Sketch Map showing the Whaling Grounds and the course usually taken by the "Humpback" and "Right Whale," from October to March. By J. Innes Wilson. 1:2,000,000, or 1 in.=31.56 miles. 53½° - 55°½° S.; 38 2/5° - 35½° W. With inset: Sketch Map of N.W. part of South Georgia from the latest information received from whalers and sealers. 1:1,000,000, or 1 in.=15.78 miles. 53⅞° - 54½° S.; 38½° - 36 3/5° W. Accompanies "The Coast of South Georgia," *Geogr. Journ.*, Vol. 39, No. 1, 1912, pp. 77–79.

[Embodies valuable new material.]

ARCTIC REGIONS. (a) Discoveries in the Arctic Sea. With Additions and Changes to 1909 by Capt. J. Bernier. [Mercator's Projection: equatorial scale 1:5,900,000. Mean meridional scale 1:1,600,000 (1 in.=25.3 miles)]. 79°45′ - 65°40′ N.; 128°0′ - 66°30′ W. 2 colors. With inset: Continuation of Land North of Smith Sound Chiefly from the British Arctic Expedition, 1875–6. [1:2,600,000 (1 in=41.0 miles)]. 83½° - 79° N.; 85° - 45° W.

[Shows, on revised Admiralty chart, route of Capt. Bernier's expeditions of 1906–7 and of 1908–09.]

(b) Portion of Chart showing Second officer Morin's and Third officer Green's Tracks to Banks Land and Victoria Island from Winter Hbr. Voyage of C. G. S. *Arctic*, 1908–09. [Same projection and scale as map (a).] 78° - 71° N.; 128° - 99½° W. 3 colors.

(c) Winter Harbour, Melville Island, Arctic Sea. 1909. [1:30,000 (1 in.=0.47 mile)]. [74°48′ N. and 110°55′ W.]. 1 color.

(d) [Map of Jones Sound by Gunnar Isachsen]. [Mercator's Projection: equatorial scale 1.2,000,000. Mean meridional scale 1:446,000 (1 in.=7.9 miles)]. 77° - 75 2/3°; 91° - 81° W.

[Facsimile of MS. map found by Capt. Bernier on Cone Island, Jones Sound, in Aug. 1907. Original survey of south coast of Ellesmere Land, subsequently published in the report on the *Fram* Expedition of 1898–1902 under Sverdrup].

Accompany "Report on the Dominion of Canada Government Expedition to the Arctic Islands and Hudson Strait on board the D. G. S. *Arctic*" by J. E. Bernier, Ottawa, 1910.

ARCTIC REGIONS. (a) Geological Sketch Map of the Northern Islands of Canada. Geographical outlines those of map published by Department of Interior, 1904. Geology from results of various expeditions. [1:4,700,000 (1 in.=74.2 miles)]. 90° - 61° N.; 130° - 20° W.

(b) Sketch Map of Southern Portion of Melville Island. [With indications of the geology]. [1:2,360,000 (1 in.=37.3 miles)]. 76° - 74° N.; 115° - 105° W.

Accompany, in pocket and on p. 449, "Geological Report of Arctic Expedition, 1908–09" by

J. G. McMillan, pp. 382–491 of "Report of the Dominion of Canada Government Expedition to the Arctic Islands and Hudson Strait . . ." by J. E. Bernier, Ottawa, 1910.

[Map (a) a valuable general geologic map of the Arctic Archipelago embodying the results of all previous geologic exploration].

GREENLAND. (a) The Eastern Settlement of Greenland. From F. Jónsson, 1899. [1:2,100,000 (1 in.=33.1 miles)]. 61°18′ - 59°42′ N.; 47°12′ - 43°0′ W.

(b) The Western Settlement of Greenland. From F. Jónsson, 1899. [1:4,000,000 (1 in.=63.1 miles)]. 67° - 63° N.; 54° - 49° W.

Accompany "The Norsemen in America" by F. Nansen. *Scott. Geogr. Mag.*, Vol. 27, No. 12, 1911, pp. 617–632.

[Show the locations of the ruins of the homesteads of the ancient Greenlanders. Reproduced from Nansen's "In Northern Mists"].

WORLD AND LARGER PARTS.

NORTHERN EUROPE AND NORTH AMERICA. Countries and Seas Discovered by Norwegians and Icelanders. [1:50,000,000 (1 in.=789.1 miles)]. 82° - 40° N.; 75° W. - 70° E. Fig. 5. "The Norsemen in America" by F. Nansen, *Geogr. Journ.*, Vol. 38, No. 6, 1911, pp. 557–580.

OCEANOGRAPHICAL.

AUSTRALASIAN MEDITERRANEAN. [Wind- und Stromverhältnisse auf der Fahrt von Singapore nach Friedrich-Wilhelmshafen vom 17. Oktober bis 10. November 1910]. [Mercator's Projection: equatorial scale: 1:24,000,000]. 4° N. - 10° S.; 103° - 149° E. Accompanies note with same title, *Ann. Hydrogr. u. Marit. Meteorol.*, Vol. 39, No. 11, 1911, pp. 662–624.

INDIAN AND PACIFIC OCEANS. [Map of steamship routes between Durban and Nagasaki or Yokohama]. [Mercator's Projection: equatorial scale 1:100,000,000]. 38° N. - 35° S.; 27° - 143° E. Accompanies "Dampferwege von Durban nach Japan oder Sibirien," *Ann. Hydrogr. u. Marit. Meteorol.*, Vol. 39, No. 11, 1911, pp. 504–591.

KATTEGAT-BALTIC SEA. Tiefenkarte der Beltsee, von Dr. Hans Spethmann. 1:340,000 [1 in.= 53.66 miles). 56°19′ - 53°53′ N.; 90°24′ - 13°30′ E. 6 colors. With inset: Nordende des kleinen Beltes. 1:50,000 (1 in.=0.79 mile). [55°30′ N. and 9°40′ E.]. Taf. 29, "Tiefenkarte der Beltsee" by H. Spethmann, *Pet. Mitt.*, Vol. 57, II, Nov., 1911, pp. 246–251.

[Critical combination embodying recent soundings in the straits of the Danish archipelago. Six depths indicated.]

NORTH ATLANTIC OCEAN. [Eight maps entitled:] Oberflächentemperatur and der Nordwestafrikanischen Küste. Jan.–Apr. 1910. Jan.–Apr. 1911. [Mercator's Projection: equatorial scale 1:28,000,000]. 30° - 5° N ; 20° - 14° E. Taf. 30. "Oberflächentemperatur des Nordwestafrikanischen Auftriebgebietes" by A. C. R., *Ann. Hydrogr. u. Marit. Meteorol.*, Vol. 39, No. 11, 1911, pp. 593–595.

HISTORICAL.

ARCTIC REGIONS. (a) Arctic Discoveries and Explorations up to July, 1853. [Mercator's Projection: equatorial scale 1:17,000,000. Mean meridional scale 1:1,750,000 [1 in.=27.6 miles)]. 78° - 70° N.; 125° - 90° W. 5 colors.

[Facsimile of MS. map found by Capt. Bernier among records left by Capt. Henry Kellett, H.M.S. *Resolute*, on Melville Island in 1852–53. Indicates by whom the various sections of the coast were surveyed].

(b) [Facsimile Chart of Behring Strait, 1852. (McClure.) [Mercator's Projection: equatorial scale 1:11,800,000]. 74° - 63° N.; 173½° - 153½° W.

(c) [Facsimile Track Chart, H.M. Sledge *Success*, Barrow Strait, 1851]. [Mean scale 1:900,000 (1 in.=14.2 miles)]. 75°0′ - 73°50′ N.; 99° - 95° W.

Accompany: Map (a) in separate envelope, maps (b) and (c) following p. 334, "Report on the Dominion of Canada Government Expedition to the Arctic Islands and Hudson Strait on board the D.G.S. *Arctic*" by J. E. Bernier, Ottawa, 1910.

KOREA. (a) The Three "Han" [political divisions of Korea at the beginning of the Christian era]. [1:8,400,000 (1 in.=132.6 miles)]. [43° - 33° N.; 126° - 131° E.].

(b) The Three Kingdoms [about 600 A. D.]. Same scale and coordinates as map (a).

Accompany, on pp. 61 and 67, "The Story of Korea" by J. H. Longford, New York, 1911.

SOUTH AMERICA. Map of South America. For the Rev. Dr. Robertson's History of America. By Thos. Kitchen, Senr., Hydrographer to his Majesty. Published . . . Septr. 29th, 1777, by W. Strahan and T. Cadell in the Strand. [Facsimile]. [1:28,000,000 (1 in.=441.9 miles)]. Accompanies, facing p. 44, Vol. 2, "The Andean Land" by C. S. Osborn, Chicago, 1909.

TASMANIA. (a) Bays on the South-East Coast of Tasmania, from Lieut. Bond's Log. [Linear scale incorrect; should be 1:340,000 approx. (1 in.=5.4 miles)]. [43°23′ S. and 147°33′ E.]. [Facsimile].

(b) Part of South-Eastern Tasmania, from Hayes's Chart. [No scale. 1:770.000 approx. (1 in.= 12.2 miles)]. [42°45′ - 43°40 S.; 146°40′ - 147°40′ E.]. [Facsimile].

Accompany "A Forgotton Navigator: Captain (Afterwards Sir) John Hayes, and his Voyage of 1793" by I. Lee, *Geogr. Journ.*, Vol. 38, No. 6, 1911, pp. 580–590.

CARTOGRAPHICAL.

AUSTRIA-HUNGARY. [Extracts from the Generalkarte von Mitteleuropa, 1:200,000, sheet Trient]. [46°30′ - 46°10′ N.; 11°10′ - 11°50′ E.]. 16 colors. Accompanies "Luftschiffahrt und Landkarte" by K. Peucker, facing p. 360 in Hoernes: "Buch des Fluges," and "Verfahren zur Herstellung farbenplastischer Darstellungen, insbesondere Karten (Flugkarten)" by K. Peucker, *Österreichische Patentschrift* Nr. 48671, k.k. Patentamt, Vienna, 1911.

[Map on the contour system of coloring, mainly for aeronauts. Specimens given of relief represented by contours and shading, by contours without shading and by shading without contours in addition to the color layers. Cf. review, *Bull.*, Vol. 43, No. 6, 1911, p. 465.]

XUM